Re:/ award diplomat certificate,markshet transcript letter experience theoretical practical engineering n studies outcome

Inbox

tshingombe fiston <tshingombefiston@gmail.com> May 29, 2024, 6:26 PM

-Address:postal.

-Francis bard Pretoria Department of Higher Education and Training

123 Francis Baard Street, Pretoria Central

Room 506_012 312 5440

To:St peace college and instituts, tvet Dhet
-Date :subject :completion letter :
Practice experimental log book.

-1. To concerne
This letter serves confirm .Mr was participations in the work integrated learning programme of department : Dhet research assessment irregularity national examination nated n4 to additional information and workbased on visited circular practice external on line job work practice on department of energy minimal compagny career CVS and industrial portal council work city power day visited on line Facebook,Gmail badges,Eskom career day 28day appointment,sarb career engineering artisan electrical electronics engineering,Microsoft Scheiner career certificate training, Eaton electrical dtic day project engineering ,sasseta saps psira career mil engineering career metropolitan
,log back project isita DBE and participate assessment engineering electrical for n studies engineering n diploma national framework work qualifications NQF saqa subject research engineering electrical at St peace college 20days work ,circulum on line computer practice topics research engineering electrical at St peace college practice CVS computer aid .from 20 february 2022to 20 april 2024 in the area of engineering it expected following subjects.
-Computer and information management system in education learn engineering assessment police and safety 1,and engineering safety security.class orientation guidelines./technical documentation libraries engineering learn.
Outcome career subject entry irregularite time table revisit , irregularite career material illegal job material induction mentorship subject trading entry subject trade electrical theory , industrial electronics , mathematics, engineering,electrotechnic , industrial orientation science engineering drawing n1,n4,n3,n2,n5,n6,nstudie career experience exhibition electrician wiring
panel,code ,generator power station transmission engineering subject irregularite career policing subject detective , business studies career ,advance field research electrical career lecture asssessor senior trade theories lecture irregularite engineering trade , module week material AC DC courent mesure instrument , exhibition career power station plant theory sum AC +DC machine +instrument measure to evaluate generator , transmission career job and advanced continued assessment framework qualifications compagny,summarise module subject math , engineering science draw .

-1.1Section one

1.2 Assist in the capture /profiling of job application career portal log activities on line internet project data development engineer path azure GitHub Microsoft autocad Autodesk Microsoft
-engineering design analyse.kheta advice national career ,investigation system visual studio development.ms office . engineering electrical automate programmation computing trade theory assessment subject time table allocation topics.enginering drawing n autocad topics relate nated Eaton assessment
2.typing of memos and minutes exam papers topics assessment self assessment draw sharp table engineering electrical planing.
1.2.design of reporting template: tableexcell ups engineering electrical software.

-management and training assessment panel wiring electrical
-assiste with headling career filing .
-capturing of career information system.database recruitment informers investigation electrical data source reports.career portal advices .
-sorting distribution files information management system Education irregularite database system Portofilio.
-allocated consultation and information record management system database assessment.engineering
-handing inquired admnise communication skill , orientation industrial design template attandance registration on line form visual basic ,excell ms word .
-relation labour handing of Portofilio survey interpretation status ..
-duty monitoring assessment moderator asssessor engineering electrical n studies and level irregularite material suspension transcript marksheet years .
Staff, daily staff delegation compilation of duty .
-monitor
-filing of retrieval of engineering assessment transcript record instituts saqa college topics project azure back log ..hrs practitioner..

1.3.library and information service :sciebono career center and St peace college info class re rwiten

"Engineering science career" ,
-research process : reseach method plan and disc ,collected and collected capture analyse collaborate and create management store preserve share and publish assessment textbook topic, monitoring and evaluation,emerging qualitative and quantitative missing text book engineering electrical.
-research methodology engineering electrical topics vs research triangle.qualitarive methods quantitative methods ethnographic participate observations studies depth description engineering communication source data engineering ethnographic r group, participate research involving esearch case studies engineering electrical,source.
-textual critical in social engineering,survey aim to provide overview,
-experimental design laboratory controlled conditions physic psychometric technical ,field natural experimental design ,aim to provide a board of a representative sample of large .
-secondary data analysis using existing data it aim.
-conceptual analyse meaning of ward or concept clarification theory buildings on role building studies,literature review studies .
-types of qualitative research design ground theory research narrative.hiatorical case studies and phenomenology design engineering field.
-grounded theory is systematic procedure of data analysis typically associated.phenological studies design engineering electrical,case study research advanced field,
-wath are research method in library data collection first is to choose a suitable methode for collecting primarily data depending reseach topics objectives methode interview observations and case subject..
-step of library research process identify and development topics do preliminary locate material evaluation make note ,rwiten papper ,import method for data collection ,survey quantitative interview library.
.**1.4.1.technical documentation in simple steps: business files and data during operation documents size store career control** access keeps record and analysis career outline engineering step on line save download day part time learning.
-consider a degree or certificate.
-develoo skill on experience.
-primairy :collecting record work clerk retrieved engineering career .
-cataligi g data files and digitalise create file documentation organisation job engineering research analysis thing .technical knowledge soft ward .help desk technician types customer service , responding to customer support inquiries and documents feedback from customers .Google it support rating .
-research faculty teach and learning research lab learning environment clinical simulation practice of simulation teach to develop outcome student team work communication self assessment, simulation base education la assessment,task training task oriented , simulation lab ,booking Education technologie, engineering science career electrical module engineering board

-work purpose lab work conduct of experience,prepare work ,note book, of log book prepare rwiten

engineering general format engineering, introduction theory procedure methode ,result vocational career trading guidelines.

_____

2. Section two.

Department energy mineralogie compagni ,Eskom
-related minimum experience.
Technical experience and engineering related technologies, skill and competencies leader .
-knowledge: relate technologie design codes and standards , engineering theory relevant processes ,police guidelines and legislation engineering design.
-technical problem solving co technical cost analysis presentation.
Key responsibilities , resolve complex integrated engineering problem variations integrate life cycle plan for .
Provide special engineering,advice assistant manager engineering projects modification.perform technical and financial evaluation

-Power Serie books on line research team future of power engineering lie experience engineering.
Topics
Application post :28days booking confirmation shared successful or unsuccessful.plant generation substation power station transmission metering post megawatts financial .

-planing design construction of overhead power line principle system planning .insulation .
_fundamental and practice of overhead line maintence . theory of overhead line management topics , implementation of work sole inspection
-practical guide to outdoor council engineering high voltage characteristics electrical test specific flowchart inspector.
-theory design maintence and life management of power transformer,theory principle and practices of design , fabrication overhead power line structure of towers moves and diagrams.
-power line tower one testing .
-transmission theory design and performance role ,in electrical design ,AC DC, ,hybrid,loss may , economic DC line conductor , conductor charge .
-thermodynamic for students practicing engineering under thermo essential for power plant design and volume , outline key thermodynamics,
Princit steam and plant compressor refrigeration plant entropy engineering to design thermal fluid machine theory to plant operating and new design is
-applied system dynamics with south Africa case studies system methodology for studies manàge change over relief respect flow accumulation material control the flow industrial.

-practionner and sustainable mentorship and coaching book

- 2.2 .purpose career explanation : course customers training manufacture execution scheineder electric PLC introduction to PLC level 1, ecostruxure control exper programming level 2,intermediate introduction machine ,ecostruxure process expert hybrid process, supervisor control 2data acquisition software configuration workspace situation , network connectivity control ethernet io ,human machine HMI programmation, telemetry truo licensed radio remote connect ,
-motore control introduction to variable drives altivart process system ,low voltage electrical distribution l.v.e.d ,SPD ,surge protection device ,on demand.
-low voltage low voltage distribution l.v.e SPD ,medium voltage permet set , medium voltage electrical distribution m.v.e, electrical novice ,
Ecostruxure power monitor expert power monitor project deployment
-explanation diagram: note technical
(Ups stream) , yes (USC %) ,=yes HV (transformer rating)=yes ,(power factor coincidence duty

factor fore seable expense),(yes load rating).
(Conductor charabke ,busbars,length, width, thickness,cables, type insulation, single core, length,cross section, environment,ambient temperature, installation method,number of,) Yes,,(ISc at transformer terminal)yes ,,ISC LV switchboard out goes)yes : (ISC switch board outage ,yes head of final switchboard yes),ISC end final), (breaking capacity,) yes(SST and install trip sitting yes) , (breaking capacity yes , St and strip ,(breaking capacity St ms, final .
-explanation: calculation impedance of power source the up streav network the power supply transformers as well as of the electrical lines
Problem consider a 20kv network that supplies a HV / LV substation via 2 m overhead line and MVA generator that supplies in parallel the busbare of the same substation two 1000kva parallel connected transformers euply the LV,busbar which in turn supply 29out gears to 20 motor including the one supplying motor .all motor are rate 50kw all connections cable are identical and all motor are running when the fault occurs the isc3a d up value must be calculated at the variouse fault location indicated in the network diagram.
-point A on the HV busbars with a negligible impedance.
-point B on the LV busbar,at a distance of meter from the transformer.
-Point c on the busbar of an LV su distribution board .
-point D at the terminal of motor Mthen the reverse current of the motor must be calculated at C and B .
up then D ,A
_____
Upstream network
U1=20Kv, SCC=500MVA , overhead line,3 cable ,50mm , copper length=20km,
2). Generator, 1MVA ,xsub =15%,t
3) transformer , 1000KVA secondary winding 237/410 ,USC=5%
-mIn LV switchboard 3 bars ,400mm sqr /ph copper , length=10m,
-cable @,3 single core cable 400mm aluminium spaced laid flat length =80m,
-Lv sub -distri utilisation board neglected the length of the busbar,
-cable ,3 single core cable 35 mm sqr copper 3,phase length=30m ,
-motore

Drawing 1.

Reactance x and resistance are calculated with respective voltage in the installation relative impedance
-solution :

Section. |Calculation. |. Result x,R

20KV
1.upstream network|Zup=(29×10 exp3)exp2×10 exp 6.(1)
Xup=9,97 zup (2)
. | X(ohm) (R(ohm)
Rup=0,2zup env 0,2 xup
X=0,78 ohm
R=0,15 ohm

2.over head line |XCo=0,4×2 (7)
|RCo=0.018×2000÷50
X=o.8.
R=0,15ohm

3.generator | XG=15÷100×(20×10exp)÷100.

-RG=0,1XG

20KV fault A. X(m.ohm) R(m ohm)

4.transformer | Zt=1/2×5/100×410 exp2/19 exp

Zt on LV side | XT ~ZT.
Rt~ 9,2

410v

5.circuit break | . Xcb =0,15 ,15 ,,0,15

6.busbars one busbars | xB=0,15×10 exp -3 ×10
X=4,2, and R°0,84

RB=0,023×10÷400..
One 400mm .sqr bar
X=1,5 m ohm
R=0,5

Fault B
7.circuit breaker | xcb=0,15
R=0,15

8.cable.1
One 409 mm cable
Per phase |xc1=0,15×10 exp -3×80 |
Rc2 = 9,923×30÷35....,,

Fault c
9.circuit break ,xcb=0,15.....

Fault D
11motor 50kw |xm=25÷10×410 exp2/5010.9×0,8)×10 exp ,3
RM=0,2 xm

Impedance calculation : fault at A(HV busbars is to the generation
XA=0,78+0,8~1,58 ohm
RA=0,15+0,72~,0,80,
ZA=√RA.RA+XA XA~1,89 ohm
IA =20×10 exp 3 ÷√3×1,80~6,415
Peak asymmetrical ipA, RA÷XA=0,55,,K=1,2
IPA=1,2×√2×6,415=10,887A.

Fault at B LV base (1,2,3)+(4,5,6)×R,,97 motor .
(410÷20,000) Exp 2=9,42.10.exp -3
XB=[(XA.0.42)+4,2+0,15+15]×10exp -3
XB=6,51 m.ohm and RB=[(RA.0,42)+(0.84+0,57]× 10.exp -3
RB=1,77 m.ohm
- fault D motor (1,2,3)+(4,5,6)+(7,8)+
XD=(XC+015+2,7)×10 exp -3=21,52m
RD=(RC+19,2)×10 exp -3=28.2 m.ohm
RD=(RC+19.2)×10 exp -3 =
ZD=√+RD.Rd)+(Xd.xd) =35,5m ohm
I'd=410÷√3×35,5× 10 .exp -3 ~ 6,700A
RD÷XD=1,31 ,, K~ 1,04
104×√2×6,700~9,9000A
XM=(605+2,7)×10.exp-3~ 140 ohm ,ZM = 624 m .
IM=410÷√3×624 ×10 exp -3 ~,379A
20 motor ,IMC =7,589 A

-ZB=√(RB.RB)+(XB.X.B=6.75m ohm

IB=410/√3×6.75×10 .exp-3=35,070A.
RB/XB=0,27
XC=(XB+0,15+12)×10 exp -3=34,7mohm
RMD=(140/19+19,3)×10 exp -3~26,m
ZMD=43.8m.ohm
IMD=√410/√3×438×10.exp 3=5400A.
6,700+5,400=12,100A en and iPad ~ ,18,450A.

Symmetrical, method 3phase network is unbalanced, magnetic cyclical impedance
no longer , voltage
-positive sequence , negative sequence.
I3,I2,I1 ,we vector geometric construction. Labell

-Fault estimated,
7,440×410/20×10 exp 3=152,5A
Rough calculation.D
Sum x = 4,2+1,5+12=17,7 mohm ,=xD
Sum .R=7,2+19,3=26,5m ohm .
Z'D=√(R'D.RD)+(x'd.xd)
The peak iPad
√2×7,430~10,500A.

Peak asymmetrical 4.8 time their rated current of 98A:
10,500+(4.8×98×√2×20)=23,800A.
-G=e. exp j.2π/3=1/2+j.√3/2.betwen ,I1,I2,I4,..
I2=a.a.I1+aI1+I1
I1=I1+a.I1(2)+I1(0)
I2=a.a.I1.(1)+a.I1(2)+(I1)
.. calculation IEC , 60909>550kv.,
UN./√3fault

Type.of short circuit|

General situation
||fault occure
-3phase .I|||ik3=x.un/√3.|z1)
Zk°√Rk.k+xk.xk. |. I''k3=C.un/√3|z1.
-Ze.=©©|Ik"=c.un/|Z1+Z2|| Ik"=c.un√3. 2|Z1|

Phase to earth Zsc phase o |Ikez=CUn√3|Z1|÷z1.z2+z2.zo+z1.z2.
- Ik2el2=Cub|Zo-aZ(1)÷Z1.Z2+Z2.Ze+Z1.Zo.
Ik2EL2=C in |zo÷z1|-a ÷Z(1)+2Zo
-_____
UnQ=20kv
IkQ=10kA.
T(St.
Cable In.,4m, in =400v,
Sr=400KVA
Ur THv=20kv.
Urkv=4%
Pkrt=4,6kw,
R(o)T/Et=
Problem network supplies transformation, Ik" peak short circuit,I=4m ,
3×185mm,sqr Al
ZL=(0,208+Jo,o68) ohm .km
R(o)L=4.23, X(o)L=1,2.

Solutions fault at F1, impedance of supply network (LV.)
ZQt=CQ.UnQ÷√3.I".kQ×(ur.TLC÷urtHv)exp 2=1.1×20÷√3×10×(0,41÷20)exp 2=

0,534.

Problem power station unity
Stag=250 MVA,,,UrG=21kv ,RG=0,0025 ohm
X"d=17%, XD sat =200%, cos alpha , ,art ,= 250MVA,,
UrTHV÷Ukr=240Kv÷21kv,= ukr =15%,

Impedance generator ,
X"d=x"d÷100×U.U.r.G÷srG=17÷100×21×21÷250=0,2999ohm
ZG=RG+jx'd=0,0025+j0,2999
|ZG|=0,2999 ohm
Srg> 100MVA, RGf =0,005x"d,ZGf=0,0015+j0,2999
KS=UnQ.UnQ÷UrG.UrG ×Ur.Ur×tLv÷ur×thv×Cmax÷2+|x"d-xt|sin alpha
ZS=ks×(t.r×tr.ZG+Zthv)=
0,913(240÷21)exp 2×(0,0025+j0,2999+(0,479+j34,555)
ZS=0,75+j67,313
Zsf=2,226+j67,313
I'm"s=CUnQ÷√3Zs=1,1×220÷√3(0,73+j67,313=0,023-j2,07s,
|Is|=2,08KA
Solutions.
Tree phase fault at F1.
-impedan e of transformer
ZTHV=Ukr÷100×urTHV÷srt=15÷100×240×240÷250=34,56
RTHV=PkrT×Ur.Ur×thv÷srt=15÷100×240×240÷250=0,479
XThv=√z.zthv-rthv.rthv=34,557 ohm.
ZThv=(0,479+j34,557)

-3.section 4 .
Purpose :
Power explain hand book
-basic network analysis /and advance field college. University explanation career
-instrumentation ,
-DC motor and generator ,
-transformers ,
-three -phase induction motor.
-single phase motors
-synchronouse machine.
-generation of electric power.
-Ovehead transmission lines on under ground cables .
-stationery batteries.
-electric energy economic method ,
-ligthing design.

Label drawing resistor groups

- explanation : serie -parallele DC circuit to be analysed:.
Combine all Serie Req=R1+R2+R3+...+En
DE=RB+R14=200+40=240 ohm ,Req, GG=
R7+R8=200+400=600 .ohm , Req ,=, R10+R11==400R.=//.
Req=R1//R2=R1.R2/R1+R2)
G.G=R5//R6=(1009×1500)/1000+500)=600 ohm.
Sum VD, E=VAB+VBC+VDE+VEF
460=60+100+50+120+130v
-computw the current ,V1=VAB+I1.R1, VBC =V2=V3,
VCF=E-(VAB+VBc)=460-(60+100)=30
IA=IT[RB/(RA+RB),
IB=IT[RA/RA+RB, ..

I5+I6=0,5/2=0,55=I5=0,25×(1500/2500)
____----------
Explain draw Motor source
-Id = Q c |VC|=1220 VAR (120v)=12
(0+j10,2).@ motor)=cos exp -1)×0,7=45.6
IM= 114.29 /_45.6 °=(10-j.10,2)
IT=IM+IC=(10-j10.2)+(0+j10,2)=10/_0°
100 percent factor capacitor installed in switched bank to provide a range of of correction
(S=P/cos)Teta=1200/0,7=1714.
S/|E|=(1714VA)(120V)=1429.
|.I| ×cos @=(1429A)(0,7)=10A.
QL=|E|I|.√1-cos.xos /_, reactive power factor ,
QL=(120)×(14,29).√1-(0,7)×(0,7)=1714×√o,51=1224 VAR
-Xc=VC.vc/Qc=(120)×(120/1224=11,76
C=1/wxc=1/(377)+1176=225,5

Purpose Explanation :Analysis of offset wave
Calculation average V avg= Vdx=T
T= period ,V avg =Vdx=[(12×1)-(8×1)]=2v
Vrm,v = √area[VT.t]/T=√(12×1) exo+(8×1) exp 2÷2=√104=10.2

-superposition theorem effect 20vdc, VC reached it final ,(steady-state) value
I=9,VR=I×R=0V,VC=20v ,effect of AC voltage (10.sin 377t) circuit ,XC =1/CW
=1/(377)(660×10 exp 6)=4 ohm ,Z=3-j4=5/_-53°
I=E÷Z=(0,707)(10)/_0°/5, /_-53°=1,414/_+53A
I'm=1,414/0,707=2A,
I=0+2sub(377+53°)
VR=I/R=(1,414/_53°)(3/_0°)=4,242/_53°
VR=0+6sin(377+53°)
VC=5.656/0,707=8. /_-37°, VC=5,656/0,07=8v
VC=20+8 sin (377t-37°)
V=√vdc .vdc +(vm1.vm1+....VM.vm)÷2
VM=|T|=√0.0+2.2=1441, |car|=√0.0+6.6/2=2,24
P=I.I×R=(1.414) exp 2×(3)=6v

-Explanation :
VR, 20 v , 10 sin 377t, c=660
W=2.π .f=(2)(3,1416)(60)=377.rad/s,,xL=1/(376)+26,5)×10 exp - 6
Z=R+j(xL-xc)=R+jxEQ,, XEq=xL-xc
Z=√R.R+XEq /_ tan exp -1(XEq/R=|z|/-0,,Z=100+j(188,5-109)=
√(100)(100)+(85,5(85,5)/100=133,5/_41,5°
-E= VR+jvl-jv =VR+JVC,,vx=vl-vc

Label drawing

-Explanation series parallel,RLC Serie parall Serie El,and RC ,,Z1,Z2
-I1=E/Zeq=100/_0° ÷1290/_224°=0,0775/_-22,°
Current rule I2=I1.Z3(Z2+Z3)=(0,0775/_-22,4°)
(100/$-36,9°)÷[500+j1200)+(800-j600)]=0,051/_-841°A,I3=I1Z2(Z2+Z3)=
(0,00775/_-22,4°)(1300÷67,4°)÷(500+j1200)(800-j600)]=0,0709/_202°

-Explanation.source =E=100v/_0°, load 1 ,P=200w,Qc=500v,, parallel load 2,pp=500w,QL=1200v,,
Triangle
Qxc=QL-QC=1200-500=700
S=√PT.PT+Qx.Qx=√700×700+700×700=
989,8

- explained maximum power transfer in AC circuit
Label series , source E 9v/_0°< pallele Z1=10/_53°,Z2=8/$90°,ZL

Statement of the maximum power apply thevenin circuit
ZThv=Z1.Z2(Z1+Z2)=(10/_-53°)(8/_90°÷(8/_90°)÷[6-j8)(j8)=13,3/_-37°ohn
ZThv=10,6+j8 ohm
R=10,6 ohm, xl=8 ohm ,ZL , 133/_-37°=10,6 ohm ,j8 ohm ,RL=106 ohm , ,XC=-8 ohm
ETH=EZ2(Z1+Z2)=(90/_0°)(8/_90°÷[(6-j8)+j8]=12/_90°v
Pmax=|ETh.ETh|÷4RL
Pmax =(12)(12)π(4)(10,6)=3,4w

Explain of a balanced wyE ,wyE system
VAn=120/$0°,V, Vbn=120/_-120°
Vcn=120/120°,ZA==zb=zc=12/$0°
IA=Van/ZA=120/0°,÷/_0°=10/_0°
IB=vbn÷zb=120/_-120°÷12/0°
IN=10/_0°+10/-120°+10/120°=0A
-analyse system balance ,
VAC =200/_0°, VBa,,200/_120°, VBc = 200/_120°, Zac=ZBA=zCB=4/_0°

Drawing diagram start start load source ..
Load current.
IAC= Vac÷zac=200/_0°4/_0°=50/_0°A
IBA=VBA/zBA=200/_120°/4/_0°
50/_120°A÷4/_0°=59/_-120°A
-solve line current
50/_120°=25+j43,3, Icb=50/_-120°
=25-j43,3)loS ,IA=Iac-I a
=(50+Jo)-(25+j43,3)=86,6/_43,3)-(-25-j43,3)=86,6/_-30°,A,IB=IB
IC=(-25+j43,3)-(-25-j433)=86,6/_-90°
-Ic=Icb-Iac=(-25-j43,3)-(50+Jo)=86,6/$-150° ..
_____
3..Drawing label balance, delta,

_____
3.1Explanation: instrument correct transformer line.

3.2 Explain : instrument connect transformer line
A,b,c to 3 p AC ,, RF=10k,R1=20k, Ref=10k,

. drawing labell

2×11×60=1320 ,u. Sec
RC=1/2×P1×RaC
11×60=660hz
C=2,411×E-8farad,
--_____
I=P(V×pf)=20,000/240×80)=104A,
1000,000/2400=41A,
50:5A rating,
Select potential ,2400V, step down ,120V, 20:1,connected 2400,
---
Drawing

Select current : 1500,00/1,73×1200)=72
-line -to-line ,12000V, 12000/120=100:1

_____
Vare enter selected varent ,
I line =300000(1,73×8300)=208A,,
25:5_-A
8300/1,73=4790,
4799/120=39,9A
-scale meter :
Teta ,cos exp-1,,0,8=36.9°
Reactive power=300.00×sin36,9°=300,000×0,6=180,000var

3.3 Explanation Metering internal wiring
-
Connecting a tree phase watthour ,meter with a demand register to power line ,
Drawing.
_____
Union College engineering emeritus

34Explanation DC motor and generator :
a=4, four pole ,lap wound machine constant k=N.p/aπ, N = 780/2 ,=39,
P=4 ,poles ,a=4, (390)(4)/(4π)=124,14,,k=124,14
-calculate the induced voltage function.
EA=, =k×flux×w×m×s,
Finding , 2/0,0397=35,2 rad / v.s
Calibration > EA/w.m=k.flux ,
(124,14)(0,32×10- exp 3 wb)=0,0397

3.4.1.explanation :calculate the speed calibration of the the voltmeter: EA/wm ,,
I/0,0397=25,2 rad / ,IV ,speed of 25,2 rad /s ,2 π rad , calibration , 25,2/2π,,um /s ,I-
V ,,,(r/s)(60/SM)
240 tr/Min
Draw labell
Field load
Terminal voltage ,V t=Ra-ILRa=260,8-(40A)(0,4) ohm=2449

-armature induced voltage
EA = 280v , at 1100r/Min ,
ea =(280)(950/1100)=242V
VT=EA=Is(Ra+Rs)=242V-(630)(0,02+0,0045 ohm =224,7
- explain moment inertia j
T= k2wo, k2=T/wo
{(2.40nm)/(183rad/s)=0,013
Tacc=j/DW/DT, k2Wo=jdw/St.
Integral x1=84 ,X2=0 dr= (j/k2). Integral , x 1=42 , X2=183 (I/w) dw
[t] ,84 to 0 = (j / 0,0013) (ln w) | 42, to 182
-j=(84)(0,013)/(ln42-ln183)=0,742 kg
-explanation calculation the time form dynamic breaking electromagnetic
torque=K1.Ia,
IA=EA/(Ra+Rbr).k2w+k1.k1 ×w/5.29
Or,St=(5,29jdw)/(5,29k2w+k1.k2)
t=4,355

Drawing label

-three phase scr drive for DC , scr calculation average values, equation ,Vag=
(3×√3/2π)×V×cos s
V=(440/√3)√2=359,3V
S=40°,s Bag=0,827×cos,s=(0,827)(359.3)cos alph90°=227,6
S=45°, bag =(0,827)(359,3)(cos45°)=210,1
-conversion = 1100r/Min (πrd).m
60s=115,2
Const torque ,

- explanat ion
Calculate torque ,T=K×Ia,
(10hp)(746w/HP)/1208=35,9A
T=(33,00/0,738Lb,ft=64 7 n
K=I/Is=64,7N, m/35,9A)= ,1,8n.m/A
-ea=kwm, EA =(1,8V are)(115,2rad)
=208v,,EA=VT=Ia.Ra
IA=(2276,6-208)/0,42=46,
.T=k.Ia, 40°, T=(1,8Nm/A)(46,7a)
84,1Nm.,, 45° Fring an ,T=(1.8Nm/A)(5.0A)=9.N.m

Analysis of a transformer connected to loan.
3.5-explanation calculation moment inertia ,
T=
Armature=, poles
(0,75)×(12,4Ia)=9,3 armature field current IL=(0,048)(41,7A)=2,0A
R shunt field , RF = V1/If=240/2.0A=120
IA=IL+If=41,7A+2.0A=43,7A
IA.Ra=(0,0061)/(240v)=14,64V, Is =43,7
RA=14,64v/437A=0,335
_____
Full load IL motor ,IL = 5000w/240V=208
EA=Vf-Ra Is=240-(1.100ohm)(1.8A)=238V.
-pro(loss)=EA.ia=(238)(1,8)=428,42
IL+If,, VT=240,,V=ea-Ra(IL+If)
-starting
IA=IL-If=20A-5,2A=14,8A
Induced ,EA=V.t-Ia(Ra+Rat)=240
-(14,8A)(0,330 ohm+6,57 ohm)=137,9 V,
-test stat restricted
RST=(vt-ea)/Ia-Ra=
(240v-137,9v)/34.8A-0,330ohm=2,60 ohm
-ea= VT -Ia(Ra+RST)=240v-(14,8A)<0,330), 2,60=196,6
Rst2=(vt-ea)/Ia-Ra=240V-(14,8A)(0,330+0,917)=221,5
R1=Rst2=09,97.;; R2=Rst-rst2=260-0,917
=16,83 ohm ,, R3=Rst-Rsti
=6,57 ohm - 2,60 = 3.9
_explain , dynamic breaking for separe excited motor
T=33,00/P/2πn..
P= rating , n= speed ,T=(33,000).(7,5hp)
(2π×1750 tr/Min)= 22.Lb
1N.m /0,738Lb.ft=30,5 N.m
_____
Ia-Ia×.Ia .×Ra....Vt-2v
Calculation rotational losses rate speed ,.calculate initial break
2×3,5 N.m-2,40N, m=58,6
Torq=K1.Ia,,K 1=, I a = 240 m/.1,85=1,3

...

3.6Explain:calculate a procedure,.
-computw the number of primary and secondary turn ,
-N1=V1/V turn =2500/2,5V turn , =1000turn , similarly,n=v2,250/2,5 , turn ,
a=N1/N2=, 1000/100=,10:1
I1=(VA)/V1=25000VA/25000,V=10A,,I2=(VA)/V3,=25,00Va. /250
=100A,, I/a=I'm/I3,=10A/100A=1:10

Drawing labell: I1,,I2 ,zth =5k , Z1,, N 2,, ZL=8ohm,,
Thevenin , impedance.
Z1..5000ohm,, thevenin ZL
8.ohm ,a= √Z1/ZL=√5000 ÷8=25
,,25:1.
-a2= V1/V2=2000÷1000=2÷1, a 3 =V1÷V3,
2000÷500 V =4÷1.
-primairy ,I1,,, I2=V2/Z2..
I3=V3/Z3,,, I 2= 1000V÷500=20A,,, I 3= 5000V/50=10A.

-labell transfo , primary :V=20000,Z1,N1,, N2, N3, v2 = 1000, load Z 2=, 50 ohm ,,Z 3= 50 ohm

N1.I1=N2.I2+N3.I3,,solv.
I1=(N2/N1)I2+(N3/N1)I2,
N2/N1=1/a2,, N3/N1=I/a3.
I1=U2.Ia2+I3.Ia3=(20A(1/2)+(10A)(1/4)=12,5A
-
KVA = V1.I/1000=(2000V)(12,5A)/1000
=25kva , KVA ,= V2.I2/1000
=(1000V)(20A)/1000=20KVA,
KVA3=V3.I3/100=(500V)(10A)
.apparent ,25KVA =(20+5),KVA
-impedan e wind
Z1=a2.a2Z3||a3.a3.a3Z3, Z 2=(2)(2)(50)||
(4.4)(50 ohm)=200||800=160 ohm
Z1 found in step
Z1= V1/I1=2000V/12,5=160

-power requirements:
P1=P2+P3+.... Secondly ,
P1=5+2+10-3=20w
P1=V1.V1÷Z1,,
V1=√P1×Z1=√20×2000.=200v
V2=√5×6=5,48, V3=√2×2×8=4V
V4=√10×16=12,7v, V5=√3×500=38,7ohm
a=V1/V2=200/5.48=36,51
a3=V1/V3=200/4=50:1, a = V1..

3.4 Explain, circuit , Z 1= V1 200 , circuit ,Z2=6 ohm ,p= 5 w,Z2= 8 ohm ,z 4 =, 10,Z5= 500,,
-I 1 ,v 1= 4800v,S1=100,f=60hz,
-I 2 ,n 2 , 609 v load ,S2=,50kva
N3,480v, load ,S3=50kva

a2=V1/v2=N1/n2=4800/600=8:1
N2=N1/a2=800/8=100tirb
a3=V1/V3=N1/N3=4800/480=10:1
N3=N1/a3=800/10=80 turn
I1=(VA)1,/V=1000000/4800=20,83
I2=(Va)/v2=80000/500=83,8
I3=(vA)/V3=50000/480=104,2

Performance and analysis of transformer with a logging

Diagram phasor
R1=0,3 ohm ,x1=15, I 2,N1, X2=0,015
I1, RC,XM , v2,E2, load
-E1,I flux ,lag ,E 1,90°,power factor,R1/a.a,,x1/a a, Req=R1/a.a+R2.
Xeq2=x1/a.a+X2..
Zeq=Req+(jxEQ. jxeq)
a=V1/v2= 2400/240=10:1
Xeq2=(R1.|a.a+R2)+j(x1|a.a+X2)
=(0,3/100-0,003)+J(1,5/100+0,00)=0,03059/_78.69°>
|I2|=(vA)/V2=100.00/240=416,67
I2=416,67/_-36,87°
V1/a=V2+I2.Zeq2=
(416,67/_-36,87°)(0,03059/_78,69=249,69/_1,952°
|V1|=a|V1|a|=10×249.65=2496,5

3.7-explanation loss calculation.
10kva , transformer, 40w iron low ,160-w copper loss at full load efficient 5kva,80%
Pcu,=I1.I1.R1+I2.I2.R2.
Eff= pour/pin = pour/(pour+losses
=Pour/(pour+pin+pcu
=(Va load)(Of)[Va load)
Of+of+pxu ,(Va load) n rating
Efficient=5000×o,8)(500×0,8+40+16)
(5000/10000 ,exp 2)=0,98
-level max efficient
Pcu (KVA/ kV rating,
Efficiency= p out (pour+pi+pcu) = 5000(5000+40+40)94
All day efficient , 24h trans.
Loss is a total ,P.t
(180×24)/1000=4,32kw,
W cubtotal ,(1×1×620×8+0,5×0,5×620×5+0,25×0,25×620×7)/1000=6,006kw,,20h
-wloss=50×8+50×1/2.5+50×@/4×7=612,5kw.
----------_--------
Explain draw
Generator ,I1p connection l1
 and l2 ,13kv, primary, secondary 138kv , ,load rated =50Mww,,delta start ,x1,n1

a=N1/N2=13.000/79,677=0,163,.I1s=a.I1.p√3=(0,163÷2221/√3=209...
Load { total KVA /√3=80kva/√3=46,2Kv
-46,2kva/40kva×100%=115,5%
=√3×40=69,3
=69,9kva/120kva,x100=57,7
----------+
Delta Delta connection,80 kV /√3=26,67kva,load ,=KVA,
= 46,2kva/26,67kva×100=173,2%

----------_
3.6 Explain phase induction motor ,
I1,r,1x 1, RC,XM ,E 1, v,1, i2,X2, E2,R2/s.
 equivenlent diagram
Solutions.
1.fulk load shaft power = 15×746=,11,190 w mechanical power development (pm)=,shaft power
friction ,I1,R1,X1, RC ,XM, I'2-I2/a,x'2=a.a,X2,R',R'2/s(1-s), R'2/s=a.aR2/s
Pm=11,190+820=12,010w.
2synchrouna speed (Na)=f/p,
Ns=60/2=30×60=1800 r/Min
Slip(s)=(ns-n)/Na
S=(1809-1710)÷1800=0,05
Air gap power (page)=Pm÷(1-s)
Pafg=12,010/(1-0,05)=12,642.
-rotor copper loss (pcu.pcu)=SPG

Pcu 2=0,05×12642,1=632,1
-no load test f=60hz,V=229,9,v =6,36A,P=5/2w,
-locked rotor test F1=15hz,v=24,I=24,06,P=721w,
-locked rotor test at f1=60hz,
I=110A,P=27,225w
Aveg,wind resis stator terminal=0,42ogm
No load test
|Znl|=VNl÷√3.INL=229,9/(1,73×6,36)=20,87 ohm
Rnl=Pnl/3nl=512/(3×6,35 exp 2)=4,22 ohm
Znl=√|znl| exp 2-Rc .exp #=√2a,86. Exp #-4.22 exp 2=20,44 ohm
Lock rotor test ,
Zin=V÷√3.I=24÷(1.732×24.06)=0,576 ohm
-R1+R'2=P÷3.I.I=721÷(3×24.06.exp 2)=0,415 ohm
X1=X'2=√zin.exp 2-(R1+R'2)exp 2
=√0,576 exp 2-0,415 .exp 2=0,404 ohm
To determine leakage ,60hz,
XL=(60÷15)(x'1+x'2)=60/15×o,403=1,616ohm
X1=0.3xl=0.3x1.616=0.485 ohm
X2=0.7xL=0.7xL=0.7×1.616=1.319ohm
. magnetic react
XM=Xnl-x1=20.44-0,485=19,955 ohm ,
PG=pnl-3.i.R1=27,225-3×110 exp × o,21= ,=19,602 w

3.7 Explanation:
-3÷188,5×(241,2)(241,2)×0,2÷1=185,2Nm
-R2'/S=0,2/0,0333=6,01ohm,
Z1=(0,25+j0,15)+(j30)
(6,01+j0,5/6,01+j30,5)=0,25+j0,5+5,597+j1,596=6,2123/_19,7°
-Ifl=265,6/6,2123/_19,7=42,754/_-19,7°A
It's/IfL=245,9÷42,754=5,75,   of =cos (19,7°)=0,94 log
-T=3÷188,5×+(261,3)(261,3)÷(0,49+0,5).exp ×6,01=163 , NM
Pag=Two.sin =163,11×188,5=30,746,2
-Rotor copper loss:
P2=sPag=0,033×30,746,2=1033,9w
P mech =(1-0,0333(×30.746,2=28,7223
Pour=Pmec-p rot=29,7223-1700=28,0223
Pin=3×.V1.×I1×cos flux.
=3×265,6×42,754×0,94=32,0024
Eff rotor = 28,0223÷32.022,4×100=87,5%
-effinte =(1-s)=1-0,033=0,967=96,7%
STmax=0,2/((0,24)(0,24)+(0,49+0,5)exp2)exp 1/2=0,1963
Tmax=3÷2×188,5.[(261,3)exp 2÷0,24+(0,24)(0,24)+(0,49+0,5)exp .2)exp
1/2=431,68N.m
-Tmax ÷TpL=431,68/163,11=2,65.

STmax=1-(R2/(Xm+X2)=1-(0,58÷(2,6+0,271)=0,98
Breaking

Labels
Drawing

WS=2πf/P=(2π×60)÷2=188,5 rad/s
TL=Pg÷ws=19,602÷188,5=104N.m

Resistance reactance.
R'2=(R1+R'2)-R1=0,415-0,204 .ohm
R=P÷3×I×I=27,225÷(3×110×110)=0,75 ohm
X=√z.z-R.R=√1.207×1.207-0,75×075=0,95 .ohm
X'2=X-X1=0,95-0,485=0,465 ohm
-Rotor at start
RfL=R-R1=0,75-0,21=0,54 ohm

-IEEE..test for empire
Reactance rotation|sQuire cage design|w
X1/XL : a 0,5: B;0,4;c 0,3;D 0,5
X2/XL
_____
-Performan e characteristics
Tech=1/w×3.V1.V1/✓R1+(R'2÷S)]exp 2+(X1+X'2)=R'2÷S
-AT low value of slip
Timex ~ I/was 3V1.v1/R'2×s
At .value of slip .
Timex ~I/Was.3×V1×V1/(X1+X2)exp 2=R'2/S
- Tmax = 1/2ws×3×v1v1/R1+√R1.R1+(X1+X'2)
-stator core rotor friction and wind ,
Loss ,Pag ,pin Elec ,pmec ,windage loss ,P out mec,stator resi loss
(3.I1.I1.R1)
-3phase
I.a.V1=460×√3=265,6 V ,start ,S=1,the input impedance,
Z1=0,2+ -j30(0,2+j0,5)/0,2+-j30,5=1.08/_66°
The starting current
It's=265,6÷1,08/_66°=245,9/_-66°A.
Wayne=1800÷60×2π=188,5rad/s
Vth=265,6×(-j30,0)÷0,25+j30,5~261,3V
ZThv=-j30(0,25+j0,5/0,25+j30=0,55/_63,9°
=0,24j+j0,49
Rath=0,24ohn   ,XTh=0,49 ~x .
It's=Pag÷wsyn=I2.×2R'2/S÷w.a
=3÷188,5×(261,3) exp 2÷(0,24+0,2)exp 2(0,49+0,5)× 0,2÷1=

3.9-explanation: .
1.select base value:
VA base =150MVA, vbase =13,8kv,,fbase = 60hz,value base,
2.calculate RMS stator phase current base ,Is base , Is (base) = (MVA base ×1009)(√3×Kv base)=(150)(1000)/√3(13,8=6276A,
3.)calculate peak stator phase current base ,U base , I (base) = √2×Is(base)=√2)×(6276)=8875A.
-4) calculat statore base impedance Z, ,base ,ZS (base)=KV..base / MVA base =13.8)exp 2/150=1,270 ohm
5) calculate base inductance ,La (base ,
La (base) =ZS=(base)/Abase=1270/377=3,37×10 exp -3
6)calculate field base impedance Zfd(base)
Zfd ,base = (Lad/LAFD ,base =(0,0056÷0,0138)×8876=3602A.
7)calculate field base impedance Zfd (base)
Zfd(base)=MVa base ×10 .exp 6÷id(base ,=150×10 .exp 6 =11,56
8)calculate field base inductance Lfd (base)
Lfd(base) = Zfd (base /w base = 11,56/377=30,66×10.exp-3 H
9) calculate field base voltage ,EF d base
10).calculate direct axes armortiaeur base current current is ks (base) lad / laks is base ,
=(0,0056/0,0054)+8876)=9204

11)calculate direct axis armortiaseur base inductance.
lkd(base)=Zkd(base)/wbase=1,77/377=4,70×10 exp -3 H
I Zk , direct axis armortiaseur base current
-12,). 1kd (base)(load/laks)(base)=(0,0056/0,0053)(8875)=9204A.
13) calculate quadrature - axis armortiaseur base inductance ,L,kq (base)
Lkq(base)=Zkq(base)/wb=1,77÷377=4,70×10. Exp -3
-350×10 exp 3 W-(399,8hp)(746w/HP)-44,186w=7563
-calculatiin of efficiency because =+399,8hp)(746w/HP)(100%)/[399,8hp)(746whp)+44,186wt, 7563w]=85,2%
-calculate counter ,EMF
(Tuvr)-(resist volt drop) -(reactive voltage ,240 /_0°
(1580/_-38.1°A)(0,0177 ohm)-j(1580/_-38/A)(0,046 ohm)
=240-22.0+j17,3-44,9-449-449-j57,2=173,1j-j39,9=177,7/_13°

-14 calculate quadrature axis armortiaseur base impedance L.kq(base)
Lkq (base) = Zk(base)/wbase =2246/377=5,96×10 exp -3
16.calxulate base mutual inductance between armortiaseur and field Lfd base ,lfk base = (ifs(base) / ikd (base) Lfd (base)=
(3602/9203)+30,66×10 exp -3)=12×10 exp -3H
17. Calculate base flux linkage flux ,base .
Flux (base) = La (base) is (base) = (3,37×10 exp - 3) ×8875=29,9wb

-calculate base rotation speed in r/term ,
Base speed is 120 f base ,IP = (120)+60/2)=3600r/Min
-calculate base torque ,t base ,
T base = (7,04 MVA base × 10) minimum base ,
= (7,04)(150)(10 exp 6) ÷ 3600=293 ,kLb ,ft (3972 kn.m)

_____
Calculate per - unit base Quantitie for a 150-Mva ,13,7kv,60 Hz ,3 ph two pole synchronisation machine following constant axis mutual inductance between,
Inductance between stator winding a and rotor ,L AFA = 0,0054H ,Q axis mutual inductance between rotor stator winding a and q axis armortiaseur,Lakq= 0,0963 H ,the per unit system and denote rotor
-calculate procedure:
1. Determine the speed at breakdown torque synchronous in speed is calculated from the equation n,sync= 129 f/p , r/Min where ,f frequently,in Hz and ,P= number of poles this)
synchronisation=120(60)(1800)×4 ,at the point where the torque in percent breakdown torque is 109,the speed in percent of synchronisation torque is 100,the speed %, of synchronisation speed is thus the rotor ,speed is not= 0,80 synch=0,80)×(1800)=14400trm
-calculate the hors power at breakdown
The general equation)+HP Min) /33,000f.t,lb=(torque in lb, ,n rot in r/Min)/52521 ; 16°z,,Lb , 13 in = ift
-ho = (torque in o in) (n rot ,r/Min)÷1,008,403,2
HP=(torque in o .in)(n rot in r/ Min)×10 .exp -6 break down,
HP = (10,50z in) (1440r/ Min) ÷10 exp 6=15,12÷10 exp -3, how = 1512 ..
- repulsion motor , 24 slot the armature ,
Slot ° (24)+2)=48 coil
ZR=(3,5×10 exo -3 WB)(576 conductor)(3600r/Min)(2poles)/√2)+60hz, (2pharh)=85,5

-calculate the AC impedance of the rotor circuit.
-inductuve is calculated XL=WL=2πfL.
Frequency,L=inductance,XL=(2π)×(60)×(36×10.exp-3H)=13,5ohm
Impedance of the rotor circuit is R+jxl=2,7+j13,6 ohm =13,9/_78.8°

-IK,R,JXL,VL,,
Flux magnetic properties
T=K.flux.il..kflux ,
T state /IL=2,3N
m/3,6A=0,639wb
IL=VL/Z=120V ÷ 13,9=8,63A
-3.Calcul the AC starting torque
T=k.flux.IL, T start , ..k.flux.il=(1,53wb)(8,63a)=132.

4) calcul counter efn
EA=VL-IL.Z..IL..to , 85% first càlcul
-j48.1=|20.7/_-240V, repeat IL,24°, EA = 120°/_0°-(3,6/_-24°)+13,9/$78,8°)=120-50,04/$54,8°=120-28,8-j40,9
=91,2-j40,2=99,95/$-24,2, -24° remain
Pmec=EA.iL=(99,95)(3,6A)=359,8w
-VL lag VL, of ° cos 24,2°=0,912 from information ,
Pmech = VL×IL×cos-coppwr loss = VL×IL×cos-IL×IL×R=
(120v)(36A)(0,912)-(3,6A)(3,6)(2,7)=383,97-3499=359
359.8w. VL=120/_0°.
_____&&
Drawing label
Phasor diagram motor universal :
ea°99,95/_-242°V,
|IL.R|=972V.
IL°3.6/_-24,2°
--------_____
Repulsion motor drawing diagram

3.9.Explanation,
-J√3.V.V/XD.
roduis ,is RF=√3.√Emax /XD=
√3(10)×(1,85)÷1,78=1,8p.u
V=I.××o×p×u,
Local , o (-10×√3)÷1,78=0,-j 9,96
-3 calculate steady state.
Jv2÷2(1xe-1÷XD)=J/2(I÷0,4-1×1,78)=
J.o.96.
RL=roduis
=V2.V2(1÷Xe×1÷xd)=1÷2(1÷0,4+177)=1,53pu.

- 3.10 explanation: GENERATION REGULATION:
-Ea=0,00219,power factor =0,975 ,zero
-Calculate potier reactance,XP
So=E+√3×Ia×xp , from zero power factor,.Eo= voltage at not load E,I,S. Terminal , voltage in RD= RE+DE,, DE=√3×Ia×xp
XP= Is xp÷(VLL÷√3)=D.E÷VLL=DE÷RE=0,43Pu,
EP=1,175Pu.
-power output and power factor.
Calculate the maximum output ,power for an excitation increase of 20% for a 13,8KV ,eye ,connected generator having a synchronous impedance of 38ohm phase it is connected to an infinite bus and delivery ,3900A ,at unity power factor ,
-1 drawing phasor diagram, subscription indicate initial conditions , voltage vs ,the line -to-neutral Angle and between the phase voltage and phase current.

2 .calculat voltage behind synchronous reactance
E=(1X,)+1X)-V.V] exo 1/2 = [3900×3,8÷1000) exp 2 -(13,8÷√3)]exp 1/2=14,54 KV
3.calcul maximum power Pnax
Pmax=3.E.V.I.X ,,sin§=1 for maximum
Power ,20% higher excitation.
Pmax = [(3)(1.2)(14,53)(13,8÷√3÷3,8=110MW
-Calculate power factor,
Flux =E.I÷Xs=14,53÷(3,9)(3,8)=0,97

-per unit Quadrature axis reactance calculate the synchronous and substrasient per unit reactance for the quadrature axis of the machine in the first , additional data ,for the machine are ,q-axia armortiaseur ,self inductance L,K,Kq=0,0107H, and the ,q-axia Lak = 6,3×10 exp -3 ,

-calculate ,Law
From value obtained in the two previous,
IQ=Lq/La(base)=0,0058÷(3,37×10 exp -3)=1,72 pu.
-calculate .IQ
L.q=Law+L1=1,72+0,12=1,84
Calculate ,Lkkq and Lakq.
L.k.kq=L.k.q÷Lq(base)=0,0107÷(5,96×10 exo -3)=2,80 Pu ,
IA.kq÷(La.base)+ base) ÷Ikq(base)
=(6,3×10 exp -3)÷(3,37×10.rxp-3)(8876÷8172)=2,72pu

4)
Calcul per unit value of q-q ,axis armortiaseur leakage inductance ,IkQ ,1kq=1k.kq-ILq=180-1.72=0,08Pu

5).calculate per unit transient inductance.
Lq=Law.Lkq÷(Law+Lkq)+L1=(1,72)+0,08)÷(1,72+0,07)-0,12=0,195 Pu
- calculate if and ikd
The quantity are ,ifd rfs ,Zsd (base)=
0,0072÷11,56=6,23×10 exp-4, and Ikd= rkd÷Zkd base ,= 0,028÷1,77=0,0158pu
-calculate field open circuit time constant,T,ok
T'd=Lffd÷Ifd=1,74÷(6,23×10 exo -4)=2793,Pu
-calculate: substrasient open - circuit time constant,
I" o/o=(I/Iko)(Lkd+lfd.ladпlfdd)=
(1÷0,00157)(0,19+(008)(6,66÷1,741)]=16.9Pu
-Calcul per unit transient and subtransion short circuit time constant for the direct axis the direct axis armortiseur leakage,time constant ,
-calculate per unit transient short circuit time constant ,Ta
T'd=(I/FD)[Lfd+Li.los÷+Le+Lad)
[1÷6,23×10 exp -4)(0,08+(0,12)(1,66)/(0,012+166)]=308
-Calculate per unit substrasient short circuit time constant ,T" oO
1÷F.kd×[Ln+1÷(1/Lad)+(1/Lfd)+(1/L1)]
=1÷0,00158×0,19+1÷(1÷1,66)+(1÷0,08)+(1÷0,12)

- 3.calcul per unit armortiaseur leakage time constant ,Tkd, Tkd=Kkd÷Ikd=0,19÷0,158=12.pu
I/w(base)=1÷377, Y=T÷377

-phasor diagram synchronous generator
1.determine
If the Va and V base value are equal to the machine rating ,Is base = (MVA)×1000)÷√3kv=(100)(1000)÷√3)(13,8)=4184 ,base voltage a ,13,8 kV ,per unit RMS , terminal voltage ,is Ei=1.0 Pu
Per unit peak voltage
Teta = U.O/$0°.P.u will be chosen ,phasor
2) local ,q- axis ,
EQ=|EQ|/§ machine internal power angle. EQ, ,,Eq° a+ j(r+ jxq), but ju = 1.0/$0°
Pu,where, Teta = cos -1 , 0,8 = -36,9,,,EQ=1/_0°+1.0/_-36°×j1.84=2,38/_35°
Pu power angle ,×=35°
- Calculation a frictional ,EQ=|EQ|/s.
-ea=|a|cos§=(1,0)(0,819)=0,818pu
ed=|a|.sin×=+1.0)(0,573)=0,574 .Pu and
Jq=|j1|.cos(§-teta)=1×0×cos(35°+36,9°)=0,311 ,Pu
JD=|j|.sub(×-0)=0,951.pu

-voltage ,E1, Q axis represents.
E1=Xad,j+d=eq-xd.is+rid=0,819+(1.89)(0,951)=257pu
- explain, Generatie - capabilities curve :
generator , supa ability curves , supplied the manufacture is used to determine the ability of generator to delivery real (Me) and reactive ,(MVar) power to a network determine the capability curve in per unit value of a generator
-characteristic : 989 KVA ,of = 0,85 synchronous reactance ,XD = 1,77 Pu , maximum value of generator internal voltage ,Emax =1,75 p.u terminal voltage ,V= 1.9 Pu ,§= load angle and the system reactance external to generator ,is XE=0,4 .p.u

-calculate stator limited portion stator ,limited is directly proportional ,full power output ,arc ofa circle medium ,Rs=1,9 p.u
- calcul field - limited,P=(3×V.Emax/XD)
Sin§+j(√3.×C.E.max÷Xd.cos§-√3.V.÷XD)

Explanation:-Generation rating for installation:-generation rating in MVA = turbine rating in MW /power factor,generator for 600-MW=rating 600Mw /0,99=677MVA.-o

3.11 Explanation: calculate generator output ,P
Po= √3×KV×IA×pf=(√3)(25)(28.000)(0,975)=1.182,125kw
-calculate generator officiency
Efficiency=power out put)÷+power output+total losses)
=1.182,125÷(1.182,125+10.910=0,99
-calculate synchronisation coefficient at rated load for the following generator : 75.000kw , terminal voltage ,V=I×o×p×u, armature current,
IA=I×p×u,
Quadrature axes reactance ,X2=1,8 ×pu×
Of=0,80 lagging , neglected the resistive components of armature
- calculated rated load angles §
The angle §=tan .exp -1.[xq×cos$×Ia÷(Ia×xa×sin$+V)]
Tan .exp-1[1.8)(0,80)(1.0)÷[(1.0)(1,89)(0,6)+1]=35°
-calculate synchronising power coefficient,Pr
Or=(rates kW)÷(rates load angle × 2π÷360)=(75)(1000)÷(2π÷360)=122,780 kW/rad.

-Generation efficiency:
Determine the efficiency of generator having the same basic characteristics of the generator in the generator regulation additional data including armature full load current ,IA=28.000A ,core and short circuit losses a friction and windage ,loss ,500Kw ,from drive rotor input ,armature , resistance ,Ra=0,0011ohm phase excitation voltage a rates ,470C, excitation current for air gap line 3200A,and output voltage ,25 kV ,compute core loss from and the potier voltage So=1.175 ×p.u, loss 21000kw

-determine short circuit loss for 1.0 Pu line current ,short circuit loss =4700kw
-calculate stray current loss ,stray current ,loss =short - circuit ,loss , armature,loss =4700-862=3838Kw
- calcul power for excitation power for excitation=field voltage ×IfL
=(470)(2,4)(3200)÷1000=3610Kw, IFL

-Determine e total losses :
--friction and windage : 500kw
Core loss. : 2,100kw
Armature copper loss. : 862 kW
Stray current loss. : 3,838kw
Power for excitation. : 3,619kw
Total losses : 10,910kw

-Explain: Generator grounding transformer and resistor.
-determine the size of a transformer and resistor required to adequately provide a high resistance ground system for a Wye, delta start connected generated rated 1009MVA ,26KV ,60GZ,in addition generator capacitance= 1,27 ,if man transformer capacitance =0,12 if ,generator lead capacitance= 0,01uf and auxiliary transformer capacitance = 0,024uf

-calculate generator line -to -neutrak voltage ,VL- N=(26kv)÷√3=15kv
-calculate total capacitance ,CT
CT=to+1,27+0,12+0,01+0,024)if=1,424 uf .
- calculate total capacitve reactance ,Xct
XcT= 1÷2πfcT=1÷(6,28)(60)+1,424×10 exp -6)=1864 ohm

-select ,R= XcT to limit transient over voltage during a line _to_ ground fault assume a 19,92÷0,480Kv Transformer the resistance reflected to the primary ,is .R'=N.N×R, R' is the requirements resistor ,solve ,R=R'B.N ,,, B= 19,92π0,480=41,5
R=1864÷41,5 exp 2=1,08 ohm

-calculate transformer secondary voltage ,Vs during a line - to - ground fault ,vs = Vs = 1500÷41,5=361V.

- calcul current Is , through grounded resistor ,Is° Vs÷R=351÷1,08=334,3A
-calcul required continuous rating ,in KVA grounds transformer rating is KVA ,= I,V, = (334,3) (361)=120,7kva.
- sele

- explain:selected short time rated transformer from ANSI standards ,a50 -kva transformer may be used 9 Min , rating is adequate,

-calculate generator line -to -ground fault current ,If , if = V/XcT =15.000÷1864 =8.05
-Power -factor improvement.
An industrial plant has a 500-hp induction motor load a 4000V, with an average power factor of 0,8 logging ,and a erage motor efficient of 90% ,A new synchronous motor rates at 3000hp is installed to replace on equivenlent load of induction motor the synchronous motor efficient determine the synchronous motor current and power factor for a system current if 80%od the original system and unity power factor
- calculate initial system rating KVA
The rating is KVA=(HP /b)(0,745/of)=(500/0,8)/(0,746/0,8)=518KVA,,n efficiency
- calcul initial system current I o
Io=0,8Ii°(0,7)(746)=597A
-neq induction - motor ,I1
I1=0,746 hob/. √3.n.pf =(0,746)(200)/√3(3)(0,9)(0,8)=299A,
- cal synchronous - motor power factor ,- PFA = 3588/40/1=0,895
-calculate synchronous motor power factor PFA , PFS = 358,8/401,1=0,895
Related calcul verification synchronous rotor horse ,3000hob,,,ho's=3×V×I×n×pf/0,746= (√3)(4)(401,1)(0,895)/0,746=3000hp

-

me

- 3.14. explanation: design calculation: autotransformer starting;

Labell drawing:

Alpha= voltage tap = VLA ÷Vs
ILA= alpha / LA = motor ,
ILL=alpha /ILA= aloha K1= Line current for
= Alpha, I1+0,15In for (a) motor torque

-ZL= total input impedance
ZL=motor impedance
Rs=starter resistance
ILR=motor current .

Motor locked rocked rotor resistance
ILR=VLR÷ZL=alpha.VL÷ZL=IL
|Z×IL| I=I×RL+jxl, I=VL÷IR=VL÷alpha×IL
=(Z/alpha) Ohm
-RiL=Rs+RL=√Z exp 2×IL- XL.exp 2
R.S = (RiL-RL)
Of = cos (Teta) = RiL + ZIL

-multi step starrting :
. drawing:

R'2/Smart/
-Rx1=Rmax
-Rx2=S1.R2.Rx4=S1.Rx3
-Rx4=S1.Rx5
rx1=Rx1-Rx2=
Rx.z=rx2-rx3
Rx3=-rx4..

-speed control operating supply,
Tm1÷Tm2=S1÷S2÷4
Tf1÷Tf2=N1. Exp2/n2 .exp 2 =(1-s1) exp 2/ 1- S2) expb
Impedance motor
XL=WL, r+jxl, T= k ,flux,L,, T = k.flux
-Po=√3×Kv×A×pf

-e valuation of annual O ,M cost Vs installed capitals cost

Cost component | unit A. | Unit B.

-Net unit heat rate .|10,55 MJ/kWh| ..-/-
-unit availability. |10.00 but kWh| -/-
-unit rating. | 95%| -/-
-installed capit cost| 600Mn| -/-
- levelized average | 18.00 % | -/-
-for annual fixed
Charge (9450×10 ,exp)(118/100)=18709×10.exp ,6
Annual fixed charge
Annual cost used for compare

91,69×10 ,exp 10 ,exp 6
- cost penalty

-3.14. Explanation :Overhead transmission line and under ground cables :
-calculate flux one conductor

-Inductive impedance
©
©. ©
- transmission line geometry portion
Diagram

.
-effect of mutual flux line.

- charge two conduct .
..Is , RK, K ,IR

Long lines Vs = VR+IRZe),expb+(VR-IR-Ze)e .expb along
Is=+VR/Zc+IR)exp + (VR/ Ze - IR) ,exp ,e - alpha e
Zc= √ Z/y- ,, propagation cost ,,
Alpha = = √ Z.y , per kilometre .

- calculating sending voltage for (200 m transmission line receiving to - line voltage ,is 239 kV ,and the is 200 at power factor ,0,8 logging promote ,R=0,2 ohm , L = 2 MH , C = 0,01 if , f = 60 Hz
Determine YL , and ZL ,
.TL = hw × CL × 1/km .1=jb×77(0,01)(19 exp -6)/km×320km= j.1206 micros sub(micro second)
ZL=RL/km×1+XL/km.×1=0,2 ohm/kn(329km)+377(2)(10 exp -3) ohm / km × 329 km
=-6,4+j241,3ohm

-capacitance of two wire line :
E=P×L/2

-Capacitance of two -wire line
E=P×L÷2×π×€×r
Vab=(resistivity ×length÷2×π×€) Ln(b÷a)
E=(resistivity ×Length÷2×π÷€)[1÷r-1÷(D-r)].V/m
r>a ,center
-V1.r=(resistivity ×Kength÷2×π×€)ln[r(D-a)÷a(D-r)].C
-D>a ,V÷2=(resistivity ×Length÷π×€)Ln(D÷a)×V
-C'=q÷V,, Q= resistivity ×length ,,
C=C'/Lor,C ,,π÷Ln(D÷a), f/m

-find capacitance to neutral for conductor transmission line ,if =
D=8ft×(2,4m),a=0,25 in (0,0⁰625)
Length of line is @0m.(16km), frequency is 377 Rod
-ZC=1÷w×c , substitute for ,X=0,0388 ,log (D÷a) obtain
-XC=1÷(377)(0,0388)(@0)÷log (2,4÷0,00625)]=0,0026 M,

-phase quadrature components
,start motor ,
VL= 120°/_0°, phasorw locked rotor ,Is=8,4/_-145°
A=8,13-j2,10A , similarly

In= 12,64/_-40,0° ,A = 9,69-j8,18
In phase = 8,13+9,69=17,82A
Iquad ,= -j2,10-j8,13=-j10,23A
I star= 17,82-j10,23A=20,55/_29°
Pfact start = cos 29°,86=0,867
T,start = k.Im.sin.a
=(0,18V,s/A)(0,4A)(12,05).sin 25
=8,46V

ZA=Za×bZ×Ca÷Zav-Zbc+Zc
Zb=Zab.Zbc÷Zab+Zbc+Zca
Zc=Zbc.Zco÷Zab+zbc+Zca

Zab=Zab+ZbZc+ZcZ2÷Zc
Zbc=Zazb+Zb.Zc+ZcZc÷za
Zca=Zazb+Zb.zc+Zc.iz÷zb

(Xa.zb+xb.xc+XC.xa)÷xc
zbc=(xa.xb+xb.xc+XC.xa)÷xa
XB.xc+XC.xa)÷xb
Xa=Zab.xca÷xab+xbc+xca
XC=xbcxca÷xab+xbc+xca

Labell
Generator ,12,2 kV, x"=0,19pu,50.000kva

Motor 1: 30000KVA,X"=0,29per ,,4,2kv
Motor 2: 20.000kva,X"=0,25. , 2,2 kV
-tfo :
Primary : 13,2kv,: 50MVA,,,
Secondary: 4,2kv, 30MVA,,
Tertairw :2,2kv,,20Mv

Label ,R'j0,68,,,L2=10,012; ,j0,002, equivalent,0,034
Correct motor reactance ,X" motor ,0,2 base ,30.000kva , 4,2kv,
(0,20)(50,000/30000)(4,2/13,2)Exp 2=0,034Pa,
X" load 2, 20000Kva , 2,2kv
(0,25)(50,000/20.000)(2,2/13,2).exo 2=0,017
Calculation of complex power ,P+jQ
Balanced 3 phase, ..
5.0/_-37°, line voltage ,is
69/_0°,per unit base of ,10000KVa and 72 kV,,

- design drawings ,

.Ix. Matrix
|0. 1. 1 |
|1/_60°. 0. J |
|1/_120° -1. J|
_____=0,863/_191,67°
|1. 1. 1|
|-1. 0. J|
|0. -1. J

Explanation-Electric -power network
2generator. // :13,2kv , and ,13,2166, sending bus ,6,6kv ,,Tertia ,transfo motor , 7,5kv , and transfo 66 kV /12 kV , output ,6motor M1,M2,M3,M4,M5,M6, 0f 12 kV parallel ,,

Labell , circuit generator with tree impedance Serie ,j0,101,,j0,03, j0,10 line and transfo two motor Ma,MB ,impedance ,j 0,222,,,h0,333

_____
Explanation
Generator 1=40.000kv, 13,2kv,,X"=0,20
Generator 2=30000kv, X"=0,25 Pu

Transformer=75,000Kv , 13,2kv,, 66,kV, x = Pu

_____
Calculate , impedance :3000kva ,
Jxtotal=(j0,15)(j0,25)÷(j0,15+0,25)+(j0,04=0,134pu

_____
Generator react .
X"=(0,25)(3000/300000)=0,24pu
30.000kva,, X"=(0,25)(75,000)/300000=0,625pu
Transfo reactance ,
X=(0,1)(30,000/75.500)=0,04 ohm py
30.000kva ,base

3.14. -explanation: Phase shift in Wye Delta.H2=B,, IBH2=A,IA,IAn,,,Generator GA ,line ,motor 0ne,ZB=0,6+j0,77 GB -ZA=15+j1,5 ohm O=√3.E/ne.IL×cos,P=E×I×cosIA=PA÷EA×c

-explanation:
-Bus iV^,, Is, Vs,, Vy^, bus j ,,I pi,you,   IPS ,,
-find slack bus power PG, ,i-j
Yn=Is+Ipr(v1-vy)ys+V1.p1

-Power,
 Sn=Pn+jQn=V1.In=V1(V1y-Vj)y+|y1|.y1|.yP1.
Sjn=Pjn+jQj=Vy.Iy=By(V1x-V1)us+|Vy|.yP1.
-Power loads in line (1-j)
Slip=Sij+Syi
-Talor
f(x)=f(a)+(x-a).df÷dx|+(x-a).n÷2!×d.df÷dx|+....+(X-a).expn÷n!×d n exp f ÷dx. Exn +Rn. df÷dx|a=,
Value derivatives evaluation x =a,
Serie converges if , Lim ,n to inf .Rn=0
Non linear.
-f1(x1,X3,.....xn)=y1
-f2(x1,X2,.....xn)=y2
-fn(x1,X2.....xn)=Yn.
FK(x1,X2,.....xn)=y, k=1,2,3..

|y1_f1(X1,°X2°....Xn°|
|y2_f2(X1°,X2°....Xn°|=
|yn-fn(X1°,X2,.....Xn|

|df1÷dx1|x1°df1÷dx2|x2°...df1÷dxn|Xn°|
|df2÷dx1|x1°df2÷dx1|x2...° df2÷dxn|xn°|
|dfn÷dx1|x1°dfn÷dx2|x(°).dfn÷dn|Xn|=
[ΔX1]
[ΔX2]
[Δxn]

[Δu]°=[j]°[Δx]°
[Δx]=(oji°)exp 1 [Δu]
[X], =[x]°+[Δx]°
[x]•=[x]exp k +[Δx] .k

-newton- raphasor , method applied to power flow

P1=sum ,n ,k=1,|V1||VK||yik|.cos(§k-§1+ aphk)= f1p.

Q1= -sum,n,k=1|V1||VK||y1.k|.sin (k-§1+alph ok)=
I = 2...

-transformers regulation determined from short circuit test ,
-% regulation = [V input - V output) V input) [100%](2300-2236)÷23000](100%=2,78%
Single phase load current, KVA = V.I÷1000=apparently,
I= 10000kva /v=(1000)(5)/23000=2,17A
Test ,of = of = W÷VA=of=90÷66)(2,17)=0,628
Lagging, cos -1,= 0,628=Teta =51,1°, cos 0,80=Teta,369°

- transfo output voltage for serving ,0,80 of load rated ,VIR = VSS cos (Teta - load) 66,cos (51,1°-36,9°)=66cos,|14,2°=64,0 where Vs = short circuit , impedance phase angle ,Ix ,,
VIX=Vsc.sin(Teta 11-teta load)=,66sin 14,3°=16,2, V input = (Voutput + ViR),exo 2+ (VIX)=2300,exo 2= (Voutput + 64)exp 2+ 16,2 exp 2 = 2236 V ,

-induct of two wire transmission
©<----D---+->© , lM day °(u÷2π)[1/4+lnD/a)WB
Turns / m ,, L= lamb /1.. L=(2×10,exp-7)
[1/4+ln(D/a).H/m, inductance ,L may be expected,
L= (2×10 exo 7) Ln (D/r) r ' = a ,
LR = 2 L = (4 × 10 ,expb-7) ,LT° 1,482×log(S/r')

-
...

[

-3.15.explanation: two wire ; 10mi(16,1km),two transmission wher ,D= 8ft(2,44m),
a=0,1n(2,54mm),at a frequency of 60hz , 377 rods /s ,
- geometric mean raduis GMR ,r'=0,7788)(2,54×10×10 .exo -3)=0,0019780,
Calculate LT=(4×10 .exob-7) ln(D/r)=(4×10 .exp -6) ln (2,44/10.001978)=28,5×10,exp
-reactance XL=(377)(28,5×10 exp -7)ln(2,44/0,001978(=28,5×10 ,exp-7hm)(16,1×10ezo ,3)=173

-1.©|<------D'11------------>©1'
2©|----D22'----->©2'
3©---------->D33<-------------©3'

Lamb=(u/2π)(I/3)[1/4+ln(S11.la)+ln(S12.Ia)+ln(D13.Ia)-ln(D12.Ia)-ln(D13.Ia
D11= lamb 11=(u1/2π)ln[D11,D12,D13) ,exp 1/3/(r'D13DB)1/3
-insuctan e , L1=lamb/(1/3)=(3×2×10×10,exo -7)lb(D11.D12.D23)1/3÷(r'D12.D23)1/3
L2=lamb 2/(1/3)=(3×2×10,exp-7)ln(D21,D22,D23),exob@/3÷(r'.D12.D23)1/3]
L3=lamb 3/+1/3=(3×2×10.exo -7) ln (D31,D32,D,33)1/3(r',D23,D13)1/3].HM
Lavg=(L1+L2+K3)3 and ,L1+K2+K3)9H/m
-LT=(2×10,exp-7)(lb[D11,D12,D13)+D21,D22,D23)(D31,D32,D33]exp -1/8÷r .exp 3.S12.D13.exo 2,D13, exp D ....
©
©. ©

Xa=(2×10 exp -7)(3([1/4Ia+Ialn.D12/a+lbD13.Ia+IB.lbD21/a+IC.ln D 31.Ia)+(1/4.Ia+IA .ln D21./a+IA ln.d23/a].IV.lnD32.a+IC ln DD12/a)+(1/4Ia+IalnD23/a+IA.lnD3+Ia-Ib.lnD13/a+IclnD23/a).IA,Ib,Ic
RMS,phase ,IA+IB+IC=,,D12=D21,D23=,vS 13= D32,
Lamb,a=+2×10.exp -7)(Is)/(3)ln(D12.D23)/a.a.a+3/4].Qb turn/
-L.dlux=(2×10 .exp -7[ln(D12,D13,D23),expb1/3÷r'],H/n

©<---------->©<---------->,© calcul ,
3,6m. 3,6m
1. 2. 3

L ,flux(2×10,exob-6).ln(3,5×7÷3,6).exp 1)3÷0,01=12,2×10,exo -6 ,H/m
Calcul inductive reaction
XL=377×12,2×10 exo -6,H/m × 1600m= 0,64 ohm

a1©-----D------© c2
V1©---------Db1.b2--------©
C1©. ©a2
GND=(Do1b1,Da1.b2.Da@.adb,D/a, db1,) expb1,

-aluminuim conductor steel reinforcement (ACSR(
-code|size|alum|out| resisC,|phase to n
Word| mil | aton|

Complex penetration depth
Drawing

o=√p/(jw), self impedance Zn,
Z,,=R1+JW×.uo÷2π×ln×2(N1+o)÷(GMR1,,,
JW,uo÷2π.ln.
Mutual impedance:
Zk=JW.yi÷2π.Lb.Djk÷Dk..
Dik=√(h-hk).exo +DL.dl.k

|ΔVu|. |[Zu][Zug] [Ky]
=
|Δvg|. [zu][zgf] [ig].
-voltage drop growing wire ,[Δvg]=0,
Zu÷zgg÷[u]

Drawing label:
Size conductor in wire solid ,scale 250,ruler ,/2,8 ,,
- reactance ohm scaling ruler ,1100, correction for multi conductor cable , single conductor in conductor in core , multiple conduct,.
.-aur earth , conductor core ,insulator

|Δv1a|. |Z11a, z12a,0,0,0, 0|. |Ia. |
|Δv2a| =|z12a,z22,0,Zab,9zac|. |I2a|
Δv1b	.	0, 0, z11b,z12,0 0.	.	I1b
Δv2b	.	0, Zab, z12b, z22b, zb		I2b
ΔV1c	.	0. ,0, 0. Z11A, z12		I1c
Δv2c	.	0,Zac , oBx , z12,Z1,		I2,c

-Δv1=ΔV,core - Δ v hearth ,,
-ΔV2= Δ V sheath
-I1= I core ,
-I2=I2 heath core ,
Z11A= z core out + z core / shear insulation+ Z sheath,
Z22= Z2 sheath out + z shear /earth insulation+z
Z12=-Z - sheath - mutual
-zab = z mutual earth - return on,
-zac = z mutual earth , return ,AC
Zbc = z mutual earth ,return .

Z mutual earth return
=Jwu÷2π{ln(aloha ×m×d÷2)+1/2-2/3ml
-cable buried ,M=√wju÷p

3.16 Explain : balanced charging 230Kv, 3Pg , transmission reactance ,0,2 m.pohn ,mi phase(0,32 ohm ,the line ,is 80 mi (28,7km)Lo
XC= 0,32÷28,7=0,0924m ohm
For voltage - in neutral , 239 × √3= 133kv , charge IC, (10 ,exp 3)(0,0925×10 exo 6)=53,2A

3.16. Explain:Data required: composition of EHv , transmission line -fault
----------|types | 765 | WHV comp | 115KVOf

-substation ,Bus ,CA350,F2,,CBL0004
500, CBL-400, 2000A, CBLO,,1000A,
Feeder, diagram showing ,I Raley =Iprimairt÷NCT=1000A÷120=8,33A,

-Differential current fault extremely
600:5,CT,Rd,, 41,7A,,,7000,,58,3,,,100A,relay ,

-bus fault,
VCT=excitation volr ,
If=current ,.Ncf=current ratio
R lead =0ne,wayle,
KP=2,
RCT=current

_____
Sect 3.,
COGENERATION:
-Power output developed by turbine stages ,
-generator and mechanical losses , B
-Boiler feed and consent pump power conscience gross and fuel heat rate ,feed water heat balance .
Gas turbine based cogeneration plant ,gas turbine.

-superheater yes boiler yes steam generator,,
Steam turbine ,process steam extraction , separator yes , generator yes , feed water heater , condense , condenser.
-cogeeneration plant
-output : kj /kWh (Vtu/kWh), heat rate =(Q1-Q2)÷P
-Q1=cogeneration plant ,, Q2=conditional steam generator
-compressor , combust , heater recovery steam , dearect , condensation return ,feed water

- cogeneration plant cycle based on turbine as the primary expression efficiency =(P+H)÷Q1,plan

-Calculate procedure , divide into sections.
- calculation total power output in each section section power output =W1.ΔH1/3600,where .
W1=steam flow through section in kg /h (Lb/h,ΔH , enthalpy drop across section in kj /kg (Vtu/LB
3.calculate total power output,
Total power output =sum ,n ,t=w1,ΔH1,/360

-rehearer. Yes 349435kg/h 3336kj/k,boiler superheater 389687 ,,
Steam generation , Sja 2383kg/h,
High pressure turb, intermediate pressure turbine, low pression turbine 1,14MPa,159444kg/h,; 3245 kj/ yes ,process system ,,700kw, 1200kw,, mechanical generator ,, 94100kw generator,
389,687 kg/h , 1041kj,,, OTTD,Fw6, 5,5 DCS ,,822,9 KJ ,,, 0TTD fws ,5,5, process steam ,, 0,62 MPA 6748,, 2,8 TTD FW ,,4772kg , 355,6 KJ ,2,8TT ,FW ,, 2,8 TT fw, condenser

-STCP heat balance for 94-Mw generator ,SjAE= process plant steam jet ,air ejector ,P= MPa , measure ,pressure ,H =KJ/kg

...

-3.18 explanatjon :Electric energy economic method:
-regulated environment
-theory of the firm, P=f[Q],stating
-production costing
- project selected,,
-framework energy market step
1 regulation ,yes standard compliance reliability security =yes, iso yes , supplies yes primary, transmission yes , distribution Tess , exchange yes commodity cash future planing yes market brokers contract search ,
-P=f[A],
-Revenue (R)for compagny use expanse capital expense operating expenses is easy, R=P.Q
-supplies , capital cost operation maintenance, individual suppliers curves work product cost .
(CP),,capital cost (k)
CP=g(k)+h(Cr)
Marginal cost production
(MCp) Derivatives of the cost production ,
MCp =dcp/dQ,
-Average cost production ,
(ACP)-Ia the cost ,ACp=P/Q
-total products cost indirect ,IL=R-Cp
Price , demand, supplies, supplies actual price , competitive, qualities,

-Ed=-(P ×.dq)÷dP×Q)
Ed>1, demand is constantly,
Cost of money,
Find weight cost ,IB°I0,percent
Stock interest rate ,IP=12% and return on common stock ,IC =15 ,percent , preferred stack, IC = 15 percent , fraction of bonds ,DR=50%, fraction stock CR=35%, prefferes stock , ratios fract preferres stock , PR = 15%

_ computer the cost of money the weight cost money (I)
I=iV.DR+IP.R+icCR=
I=(10)+0,5)+(11)(0,15)+(15)(0,359=12,05%

-equivalent and compound interest. cash flow (f),future value (P)%,rate of inflation (I,I) for future period (j) future period payment (n),
P=f÷[(1+i.i)..(I+in)]

-simplifie ,
P=f÷[1+I).exp]
Annuity = P=a(1/1)[(1+I)exp n -1]/([1+I),exp ,n
Inom =(1+1eff),exp ,m-1
I.eff=exp(Inom)-2), discount,
,sum of years digital depreciation ,cash flow,

-data declined balance

Year| remaining| annual. |accumulated
|Balance|. Depreciation | depreciatio
---
1. |1,0. |0,40. |0,4
2.
3.

Income stat for share holder

Revenue 25000
Operating expenses. $350
Interest. 300
Depreciation. 600
Income tax 420
Total expense. $1675
Net. Income. 853
.---

-find breaker even loading between units value $ 17,55/mwg is found at 40 Me loadt onunit A,and $ 18,00/MWh is found at a 6 MW loading level on unit C ..

Data. |Unit A|. unit B | unit. C

Full load Mw. |50. |35. | 16
Heat rate. |1200 | 12500| 13,500
But/kW. |11,375|11,849|12,323.
Fuel price G , |1,50|. 2,09| 1,50
$MBTu. |1,58| 2,11|1,58.
Minimum loadMw|13 |. 10| 4
Incremental Hr
Minimum load kj/kWh ,10,550|11,100|11,
50% load kj /kWh |11,280|11,100,|111
100%loaskj/kW, 12,00| 12,500|13,00
Incremental fuel cost
Minimum load $ MWh ,15,84. |22,4|17,55
50%load $ MWh. 16,92 | 23,75 | 18,72
100%load $ MWh 18,00|25,00|19,0

Loading schedule for unit A,B, and

- system load | fuel cost | unit a|unit|unit

27. | 15,87. | 13. | 10| 4
39 | 16,92| 24 | 10|4

...

[

-3.20 . explain : find loading , daily load factor,ration of the load energy is in the the day to the energy represented by the daily peak dsmt multiplied by 24h fund the daily load factor LfD, when the daily - load energy is ,21GWH and the daily peak demand is 1000MW ,

- Multiply the peak demand by ,24 h (1000)(24) = 24,000 MWH =24,GWH,
- Determine the daily load factor LFD = 21GWH/24, GWH=0,875

-Annual load factor, annual peak demand, multiple by 8760 , estimate the annual load , factor demand daily,
LFA=LFD=0,875, motion the annual load factor demand daily,
LFA=LFD=0,875, motion average daily peak load to monthly peak load ,RwM =0,85 , motion of a average, monthly peak load to annual peak load RMA = 0,8

-LFA=LfD.RwM.RMA=(0,875)(0,85)(0,8)=0,595

-load management , purpose direct energy usage away from peak load period , method peak , sensitive rate structure and automatic control of power consumption load diversity find the annual load factor LFA ,when average , daily peak load is reduced ,5% from ,1000MW,to 950 MW , assume RwM=0,85 and RMA=0,8

-find energy associated with 950 MW for 24 h ,the energy is (959)(24)=22,800Mwh
Find resulting annual load factor with a daily load energy 0f, 21,000Mwh
LFA=LFD.RwM.RMA=(21,000/22,800)(0,85)(0,8)=0,62

-cosr stored energy available charging by conversion efficiency 70%,unit energy for discharge CDC=,
.-force outage rate ,generating unit that operated 6650 ,in one year 350h ,force outages and 1860 on schedules shut down ,
=For=FOH/(FOH+FOH=,force outage hour, ,,SH = service hours subtitut ,,
350÷(350+6650)=0,05=5%

-Energy available storage is (6)(50)(057)=210MWH
Savings from operating storage (SsT),for 18,9 Mila ,kWh,, displacement energy at 35 mils / kWh is
-Sst =210j(35-18,9)=$3381
Cost , discharge

_____

Plan. |plant cost| levelized fixe|total fixe
|$kw per y| 0, kWh per yr| y

_____
A,
B,
C,

_____
.-investment tax credit =(3000)(0,10)=$300, income taxes ,
Generate income statement to share holder .

-Revenie. 25000
-Operating expenses
-interest depreciation
-depreciatiob
Income tax
Total payable
Net income

Project selected ,rate of return / minimum attractive rate of return cash flow is method to estimate interested rate equivenlent for cash loan ,be purchased for $ 1500 with $500 down payment , assume that friend
- Amount barround , $15000
10, percent interest 2yr , $ 300
Bank's charge for arranging the $20
Total. $ 1800
Monthly payment. $ 1800/24=$75,85

-cash flow stream> +$1500 month and -$75,83 each month 2 to 24
2solve interested rate using present value for annual ratio founded
-75.83(P/a) exp .I..indice 24=7583(1/I)[1+I)[1+I].exp 24, 1j/[(1+I)= ,exp ,24 =1500
(P/a) exp.I . Indixe.24=1500/74,83=19,78
Assume an interest rate , I=2%
Error interest rate , €=19,78-18,91=0,87
find , errors,I=1,5%
€=19,78-20,03=0,25
0,87,indice ,I - 1,305=0,5-0,25i
I=1,612%
€=19,78-77=0,01,,1,612%

-data for cacul levilized cost

Year	annual cost	present value	Pres v
-.	$.	Factory.	P($
.	.	[I/(+I). Exp .n	
1.	400.	0,9091.	363,64.
2.	600.	0,8264.	495,84
3.	800.	0,7513.	601,04
4.	1000,	0,6330.	682.00
5.	1200	0,620	745 ,08

288,60..find accumulated depreciation each years
,sum j.d =[(1+I).exo -1]/[1+1).exp -1],, ¥.j=I.....n
n=2, accumulation is [(1+0,1)]/[(1+0,5).exp 5-1]=0,34398,
-annual depreciation expense,.dn=[i(1+I).exp n-1]/[1+1),exp n -1),, n=2, dn =[o,1(1.1) exp
,2-1]/[(1.1).exp 5-1]=0,18018

...

Explain: stationary batteries : 20Vdc, 1,2Vdc, current sizing constant power load 10kw , will be
116,lead acid battery with a nominal 1215 design , electrolyte for entire duty cycle ,<voltage , is
1,81Vpc ,
-calculation
1.open circuit voltage,start of open discharge.
 Eoc=0,84+specific gravity
Eoc=0,84+(1215/1000)=2,055
2.)det >> average volt per cell during discharge.
=(2,05+1,81)/2=1,93Vpc
-
3)det average battery voltage ,
=1,93×116cell=223,9Vdc
4) compute the current at ,
1=1000w ,1223,9V=44,7a DC ,
Rated calculation
-DC input kW ,: rated ,100kva ,at 0,8 power factor ,of 0,91 ,, eff sizing
KVA × of ,, 87,9

-10000/1,81×116)=47,6idc ,, Nicol ,, negative
Positive plate =1,/2
Current positive plover ,,:1,75,,a 25°c ,4 positive ,plate ×70amp /positive =280A, DC

-number of cells 48 volt system (42-vdc to. 56_ vdc maximum.

- compute a cell nominal lead cell , 2.0 vdc number ,cell 48/2=4 cell

- check minimum voltage line ,= V.lim /cell=(min.volt) /number of cells
42V÷24cell=1,75 /cell

-incorect size .
Cell size (positive plate) ,
= Maximum ,s=N,, s=1,, sum .P=s,,O=1..Ap-A(P-1)÷R.t

-sizing batteries.,ampere capacity, energy electricity economic method ,data cost of electricity calculation.

-LIGTHING DESIGN:

Luminaire,height ,90°,
Pitagore triangle ,D,H,point
E=(Cd)(cos45°)/(14,14)(14,14)
E=14,14 foot candle ,
E=(Cd)(cos ,3teta)/MH.h
-food candles ,candle power /distance

E=average illuminance foot candle
N=total number of lamp luminance constitute
LL=rated lumen output lamp ,
LF= light loss foot ,
BF=ballast factor
TF=till factor
A=lightef area .

Find the level illuminance.
500lux (50fc)
750lux (FC)
Lamp: lumen rating,LX (maintenance)=1/2(L.L area ,750 LX ,
750=1/2(LL/4.).exo 2 ,=24,00LL,=24,00
Height LL=54.,00Lm,A 400w,40000lumen LLD,of ,,0,77

-layout out door lightning ,40w,- high pressure sodium, 20m ,wide × 40m long ,10m,pole 40m

...

3.20Explain : assumed power output =94,100kw,operating ,,KVA= assumed power output/power factor
=94,1000kw/0,85=111,00kva ,generating ,=operating ,,kva×1,1=(111,00kva)(1)=122,000kva,
-mechanical losses =700kw , generator loss = operating ,(KVA)(k1)/100.k2=(111,1000kvs)(1)/(100)(1,0)=1200kw
K1=1,1.....K2.

-cher h value of generator power output generator output (94,1000kw)+ mechanical losses (700kw) +losses(1200kw)=96,00kw

-boiler feed and condensate pump.
Pump calcul power , kW=enthalpy increase across the pump ,(KJ/kg)×mass flow (kg/s) base value ,
ΔH=694,3-6748=19,5kj/kg,,
W=9959+164,5321
159445+55,752=398,687,,,
BFP=(19,5kj/kg)(389,687kg/h)

(3600kj/kWh)=211kw,

-condensator pump ΔH=172,6-171,7=0,9/kg
W=139,223+22,977+2383=164,583 kg/h
CP=6,9kj/kg (154,583kg/h)/(3600kj/kWh)=41kw
-det power consumption of elect motor
Electric motor power consumption = 41kw÷0,85=48,5kw total cp

- gross power output , sum turbine section power outcomes mechanical generator loss - losses , 96,000-700-1200=94,100kw
-net power ,gross power output - internal plan ,power consumption,

-feed water heater ,heater balance.
Write , balance for heater , 5×x line (4)×(100-line (8)]/100,line (6)×line (4)+(line (I)×line =line(I)×line(3)+(x+line(6), procedure is summarised,x =17,888kg

3.21 Explain:Lighting system for an indoor industrial area:

-a lighting system need design for a metal working shop area of the shop ,,12 m (50 ft)×60 m (200ft) conversation

Typical| typical| PCC|80|70|50|30|10|0 Lumin |intensi |PW|. |. | | |. |. | Dist. |RcR|eff=|dn|up|lamp
LOw by| | with drop
High. |. Bay Open Metal Reflec
High Bay Open Metal
Industrial while ,2×4,3 lamp trafficking

3.22 Explain: comparison of commonly used lamp type (HID type ,based on 400 - w ,size,

Lamp| initial|rate|lamp|Cu| burning| minut | Lme|life| lumen| | posi|warp,hot |Per. | |LLD|
Incad|20 |.100|0,89|high| any|0, o,,very, Scent
Mercure|52,5|24.00|0,80|med|5-7, 3-6
Fluorescent|80|18.00|0,85|any,|0,0 low

Metal hol | 85-100|2000|0,75-80|higth

Sodium | 125. | 24,00 | ,0,90 | high ,any ,

Explain,
Characteristics of some popular lamp type

Lamp type. | Initial | mean | rated | lumina

Incandesce| 320|. | 750 | 200
200W,A2
Insit frost
500. ,120V
500, 120v
1000,
1500, 130

Fluorescent|2950|2800|2000|6
Energy
saving
48-in
32wt8
---
9 Mercure
Phosphor
Called

Metal. | 41,00| 31.200|20.00|460
Holid
400w, 37
Clear

High
Pressure
Sodium
250 W,ED 18| 28.000|27000|24000|295

Explain:

LIGHT System for an out door area ,
Main height,
- highest illumination level produced away from a flood light location occurs when the maximum flood light candela value ,,
-3. Determine utilisation factor.
Area ,2 mainting height (2×10m=20m)
Height (4×10m=40m)long flood light is aimed ,13/10,

X÷MH=tan @÷cosπ

-Aiming line ,
Vertical angle , in line distance , maintenance,

-Lateral distance (x)÷maintenance (MH)

-foot candles /10.00 candelas ,
Mounting height =31,6ft,
Lux /10000 candle mounting height =10m
- calculat the level illumination
Average lux = (LL)(cu)(LLD)/area =(51.00)(0,4168)×(0,9)(0,95)1(20)(40)=22,7lx
-maximum averag Luz ,30,600w

Lumen distribution ,- isocandela , curves ,, photometric data for flood light in out door ,agree light design
---
Factor to consider : level for activity luminaire.
- light -loss factor light loss factor ,
-level of illumination, extensive information on selected appropriate
-ligthing source selection cost of energy to operate light .
-coefficient of utlization (cu) the coefficient of utlization important factor ,
- deternationof illumination categories

Level

A.public space. 30lx(FC)
B.simple orientation. 50lx(5fc)
for short visit
C.working space 100lz(10fc)
where simple
visual

Common visual task visual performance task commercial residential applications recommend
---
D. Performance of visual task of high contractor and large size. 300lx
E.performance of visual task high contrast
F.performance of visual task of flow contract ,500Lx(50fc),,,, 1000Lx (100fc)

G. Performance of visual task near
3.000 to 1000lx , 300to 1000fc

Point is long aiming line is located 63°,or 2MH,this point is between the 0,8 - LX and ,1.0 line ,so the value ,0,9 can be give point a is ,10° above the aiming,point of 53° this matches the isocandela curve ,marked 400,the candela value this problem ,400, substituting , formula point a yield ,
-lux = (0,9)(400/1000)(90.000/1000)(0,88)(0,95)(1)=27,0lx
Point B,is located at horizontal angle of ,42 and the vertical angle is ,10° substitute in the formula,
Lux =(0,38)(400/1000)(90000/1000)(0,88)(0,95)(1)=11,5lx
,point c

-Roadway ligthning system:
Information already that street width is 20m the mounting height is 12m and the over hand of the luminaire is 2m the required overage maintenance level of illumination is 16 LX it necessary to. To determine the stagger spacing required to determine t staggered spacing ,require to provide the specific illumination level as well as the uniformity bof illumination with.

- explain. mounting height used in chart is 10 m to calculate the level of illumination at any point following
Lux=[lux(from chart)](Cd/1000)(LL)/(LF)(LLF)(MHct)
-lux (from chart) =illumination in LX /100cd
-cd=candela value taken from the photometric data isocandela curves at the same horizontal and vertical angle as indicated by the chart must be corrected by dividing by 1000)

-total lumens falling on outdoors area lighting system.

Vertical. |. Horizontal angle
Zone | 0-10|.10-20|30-40|40-50|60-70-to

0-10. | 13,9.|14,6|13,9|8,1|. 58,6
0-10. | 19. 53,8
10-20|6. 37,2
20-30 |4. 27,3
30-40. |3. 18,4
40-50|. 2. 11,1

50-60 | 0,5.   0,5.   0,5.
Total right side. 208,4
Left side. 208,4
Total lumen 416,8
Total lamp lumen 1000
_____&
Estimated
LF=lamp factor , which correct the lamp lumens used photometric data to the rated lumens used in the flood light in this case LF=S1,
LLf=light loss factor = lamp lumen depreciation times luminaire dirt depreciation
MHCF= mounting height correction factor ratio of the square of the mounting used in chart height used of the mounting use in chart height used in the problem in this case ,
MHCF=100/MH.H=100/100=1)

-luminaire shape of the room ,reflectance of the room surface factor coefficient type , sample table for six commonly,
+- 10% recommend value ,
-purpoae ratio ligthning system , function of cavity ratio
- section ceiling cavity ,CCR=5hcc(Lrw)/Les ,room cavity ratio ,RCR=5hRc(L+W)/Lw
FCR=5hfc(L+w)/lWs ,,

Industrial location and task(0)
Very important some ,blank = not important or applicable,
-weding
-orientatiin
-pieciasion Manuel AC
- inspection of work after
- Manuel craft
- cutting ,pressing
Design ,issue: apperence and Lyman , daylight integration,direct glare ,flicker on stroble,intrinsic ,flicker ,ligth distribution, light, luminance of 100, reflected faces object v,reflected , shadow,source task,note special

...

[

On Thu, 06 Jun 2024, 22:19 tshingombe fiston, <tshingombefiston@gmail.com> wrote: -E and w for 250-w ,HP's lamp,KL°28,00lm ligth loss factor for roadway ligth l

3.22 -explain : illumination at test point P1and P2

Contributing|. rate for test point
Luminaire | transverse|longitudinal|illum
| ration. |Motion. |

P1. ,P2, P1, P2. ,P 1, P2

A. ,1,5. 1,5. 3,75, 5 ,0,88 0,6

B.
C
D. 0,167 0,61. 3,75. Tot 0,78

Minimum illumination value of 0,6 Luz occurs at point value is the initial value per ,1000 lamp lumens to convert to the actual maintenance illumination level use lux .
Lux = [LX /(Min) (LL / 1000)(LLD) (LLD)(MHCF) maintence height correction factor vMHCF Cana read from chart
Find (06)(28,000/100)(0,73)(0,93)(0,69)=7,87lx , average to minimum illumination level is therefore ,16/7.87=2.03:1 max

4.

Section engineering 4.

- job design explanation:SPU
Duty
Design : calculation for electrical design ,
SPU: design standards and guidelines:
-4.1 introduction standard , established minimum guidelines requirements Generating electrical on project electrical
-load calculation conductor sizing, conduit sizing ,motor branch circuit sizing ,power factor improvement, transformer primary and secondary circuit sizing, voltage drop,motor starting voltage Dipa ,short circuit analysis , ligthning level , grounding ,in substation where step potential are of concern , harmonic distortion analysis, cable pulling calculation ,generator capabilities motor starting.

-software :the electrical, design engineering SPU, approved software tools are :
-SKM power tools window software,basic tools Doppler load curt voltage drop , conductor sizing harmonic analysis ,size ,and several power switch energy.
-center one available from Rockwell automation for laying out motor control centre , spreadsheet may also used

-Calculation for electrical design:

Calculati|desc|required|Req|cond|Eng|ph
| |Tool|

Load |load. |skm|. |. |. |. |. 30/60/9
Facility. | each|ptw|
Switch. |load | dapee|
Gear. |Center: per net determine bus |protective devices circuit size
---
Load| load on each|
Panel|panel board|
board|NEC to set to determine panel, circuit any transformer

Generator,| to size |car,koheler
Sizing| base on calcul on critical run and star run and start load
---
Short |available fault|skm ptw dapper
Circuit|current at each bus to determine equipment short circuit interrupting rating
---
Conductor| to sizing circt
breaker| breakers and fuses |table hand

sizing|

Conduit| to size conduit and cable tray per NEC

fill
Tray size |.

_____
Transient| for starting
Motor. | Large motor
Starting|large determine

VFD, | for motor | 90cent
Reflective| from VFD
Wave

Lighting| may be performed specif
Protection|
Strike|
Distance|

- note suggested tools for use in SPu.
Projects
4.2.responsible party contractor -provided calculation may design engt - provide criteria
4.3.required conditionally requirements
4.4.basic requirements for electrical calculation
- non computer generated calculation must be on standard calculation sheet with the heading completed filled out
-calculation generated by computer programs must conform with the following procedure
-includ all heading information on each sheet ,
-insert comments wherever possibly to clarify to concept and actions taker in the compi input
- provide clear documentation of electrical geometry support conditions load application and load requirements,
-where practical , provide sketch of model indicated nodes , material , connectivity
- provide electronic copy on CD or other suitable device of analysis input and output with hard copy calcul
-provided manual checks of pertaining resultat.
.-coding liquid radiation force air ,
- voltage regulation: maximum allowable voltage dips
- operation prime standard
-voltage rating voltage ,non linear power factor with diversity multiple step of

-basic electrical engineering
Description: volts V=I×R,,power ,P=V×I,,P=I.I.×R
-AC single phase :
Volt ,= V= I×Z ,power factor ,of=cos π
Apprent power VA=V×I,reactive power VAR=V×I×sinπ
Real power=,,W=V×I×pf,,phase Angle ,Teta = arts (w/VARS)
-Power , phase angt ,Teta art (w/VARs)
Power factor , of = w/ (V×I)=w/A
-voltage drop ,Vd° 2×(I×R×cosπ+I.xsinπ)
Vs= voltage drop in circuit ,sin π= load reactive factor,
X= reactance
-AC , 3phase : KVA = (V×i×√3),,
KVA=√kw.kw+kvar.kvar
Real power ,kW= KVA ×cos, reactive power ,= kvar = kva×sinπ
Vs= voltage drop in circuit ,sin π=load reactive factor ,
X= reactance.

Motor , 2 horse power = 746 watts
- conditions a motor control centre with a total connected horse power 337hp CA be assumed to requirements ,337 KVA of input power conservation value large motor
Torque = (HP × 5250)/ revolution per minute (rpm)

Fan go ° (cubic feet per minute [CFM]×presure)/(3300×eff)
Pump ho = (gallon per minute [GPM] ×heas×specific gravity /(3960×eff) .motors (single phase .
HP=(v×i×eff×pf)/746
...

-4.6 explan ,HP= (v×i×√3×eff×pf÷746)
-sizs the capacitor need to increase the power factor from Pf1 to Pf2 with the initial KVA ,,
KVAR=KVA×(√1-pf1.pf1-pf1/pf2
×√1-pf2.pf2)
- load calculation sizing NEC 229,430 feeder conductor and protective devices , transformer panel board and switch board main busses motor control centre components service entrance device and conductor,
-load calculation must include all load ,the should be made by summing all of the load using appropriate diversity factor allowed by NEC art 229 ,that are connected to each panel board , switch board ,and motor control centre ,an allowance must be made for future load , growth the load for each branch of distribution system can the summed ,back to the service

-Generation sizing : software generator single or multi sets must be sized to supply maximum starting (SKVA),stead - state running (RkVA) and non linear (Gkw) demand of connected and future electrical equipment.
- information critical to the sizing and selecting.
-det include.
- environmental conditions elevation temperature indoor , outdoor
Noise obtatement requirements , muffler , enclosure silent ,
- fuel diesel gasoline nature gas
- fuel storage skid mounted tank ,day and remote tank
-
4.7 Explain conductor size ,general:
-general purpose branch circuit and feeders. ,art 220
-service entrance conductor ,art 239
-motore circuit. ,art 430
-air conditioning equipment. ,art 440
-generator. ,art 445
-transformers (primary and sect
-capacitor

4.8 Explain general requirements: sizing conductor two step process .
1.step is to look at the temperature rating of the terminal ampacuty of conductor be used match temperature rating.
2.the second step to look at the effect of ambient temperature conductor derative factor ampacuty
-inaulator used to cover wiring rated maximum temperature continuous , standard rating are 60,75°,90°,and 105°, current carrying capacity conductor.
-croas -section of the conductor , insulation temperature rating ambient temperature, copper 90°, test lab switchboard panel.
-load rated 43A, conduct containing conductor load running area ambient temperature high 42°, conductor are ,to copper THHN/RHWN insulation
Ampacity required=continuous board ×125% or 53,75 amp ,6 awg copper conductor Havit ampacity of amps correct terminal the circuit breaker services load houtsw , 31-16 , applied max. Temperature exceed 30°c ,
- Ampacity 6 conductor (THHN/THWN ,wet 75° Colum)=65amp
- corrected ampacity = 65 ×correctiin factor (82)=65×82,
53,3amo

Load of 200kva existing at 480V, with a power factor of 80% determine the amount of capacitor requirements factor to 95% =of=kva÷real power (kW)

-sizing procedure generator single multiset.
- prepare a load schedule,enter individual load characteristics in software,enter load in step sequence in software enter load in step sequence in software
-have software calculation
eff=efficiency,FLA = full load Amp ,GKw=non linear kW of connected load (s),LRA=locked rollor amp. RPF=running me of connected load,RMA, reduce motor , starting factor ,SKVA=starting KVA of connected load (s),Skw=Starting kW of connected load (s) spf =starting power factor of connected load.

-resisti e loads : SKVA=RVA=Skw=Rkw
-ligthing loads (except for HD) ,SKVA=Skw÷Spf, RkVA =Rkw=RPF
-GID, ligthning loads = ,SKVA =0,75×RkvA, Skw=0,75×Rkw
-motor loads :SKVA=NEMA ×hp×746÷eff×spd×10000
-motor load 3-phaae) SKVA ,= LRA ×VL-Vl×√3÷1000)
VfD: Rkw=(drive -namwplate (HP)×646÷eff×1000
RkvA=drive -namw plate (HP)×746÷eff×pd×1000
SKVA = drive - name plate (÷eff
V.fD: Gkw=2.0Rkw
UOS: SKW=(ups-name plate (kW)+battery charging (kW)
RW=ups - name plate (kW)+battery charging (kW)÷eff
-ups GKW ,(3pulse) =2,50 §Rkw
Gkw(6pulse)=1,40×Rkw
Gkw(12pulse) 1.59×Rkw
10.reduced voltage motor starting SKVA=skva÷ RMs f
...

[

-Kva at initial power factor =√(KVA).(KVA)-(kW)(kW)=√(KVA)(kV)-(kva×pf)exp2,
KVAR=√(200kva)exp2-(160kw)exp2,kvar=√40000-25600=120,00kva
KVAR @95% power factor = √kw÷pf)exp.2-(kW) exp2-(kW).exp 2
√kvar =√(160÷95),exp-(160)exp,,
KVAR = √28,366-(25,600=52,6
-requires kvar for correction=120-52,6=67.4 kvar
-nec 460-8 criteria must met when sizing branch circuit conductor to capacitor first the ampacity of the conductor must be at least 135 the rated current of the conductor must be at least 135% the rated current of the capacitor second,if the capacitor are connected to motor circt the conductor to the capacitor should have an ampacity not loss than on third the ampacity of the motor
branch circuit conductor , capacitor rates amps=15÷(48×√3)=18
-branch circuit amp =18×1,35=24,4minimum ,motor branch circuit amp =1.25×77=96,25
N0 I,AawG at 110Amp a 1/3 of motor branch circuit ampacity =110/3=36,7Amp.

- 4.7. explain transformers: primary secondary,art 450,600v, nominal electrical system design nominal,feeder breaker , sizing 250%
-Assume ,45Kva ,3phase ,480 v , primairy 208/20,
-primairy full load Amp ,45kva ÷((480v×1,73)÷1000)=54,2Am
Feeder breaker and conductor ampacity.
54,2 amp ×1,5=81amp use ,90 amp breaker ,3 AWG copper.

-calculate secondary full-load amps , 45kva ÷ ((280volt ×1,73)÷1000)=125,06Amp, calcul secondary breaker size conductor ampacity at 125% secondary full-load, 125,06 amp ×1,25 =1563amp use ,150 amp breaker no selection copper conductor,
- note this selection limited th3 continuous load that can be suppli%×208vol×150 amp , 1,73 to

43,2kva ((80×208volt ×150ampx
-condition assume ,a 25-k a ,I-phass transformer with 480 v , primary and ,120/240-v secondary
Full load Amp (25kva÷(480vol÷1000)=52,1 amp
-required feeders breaker size and conductor ampacity,52,1 Amps ×1,5=78,1 amp , use 80 -amp breaker and no ,3 AWG copper conductor , calculate secondaire full load amps ,
25KVA ,÷(240 volts ÷1000)=104,2 amp

-required 104,2 amps ×1,25=130amp,use 150 amp no

-voltage drop : feeder and branch circuit ,
Vs =IRcos+ix sin , vd = volt drop in circuit line
I=curre flowing in conductor,R= line resistance for one ,angle whose cousin load power factor ,cos Teta =load ,L=load reactive power.
L=Load reactive power.
=AWG copper conductor feeding a Motor rated 60hp,(77A full-load) 3 phase ,460 v , through Regis metal conduit with a circuit length of 520 feet assume ,that motor power factor is 85%<
Volt drop =((520feet ×77amps)÷10000)×2,55volt =102volts.(102Vac÷480volt) ×100=2,13%drop

- motor starting : 20% volt ,level 15%

-short circuit:
Condition load will be served by 1500 KVA transformer ,a 480 ,3 phase a single phase control center the fault current availability from the utilities on source side of transformer is transformed impedance on source side ,of transformer is transformed impedance is assumed to ,5,75% base data , approximately,7,5% of nominal , 5,75%×((100%+7,5%)÷100)=5,32%

-short circuit: condition the load will be served by a 1500kva transformer at 480,3 phase through a single motor control centre the fault current availability from the utilities on the source side of transformer is unknown ,the transformer is approximately,75% of the rating of the transformer note that standard transformer impedance is valued at +1-7,5% of nominal , therefore a conservative calculation the lowest impedance should be used
5,75%((100%-7,5%)÷100=5,32%
-the current flowing during a fault at any point in an electrical system is limited by the impedance of the circuit and equipment from the source or source to the point where the fault has occurred for these simplified calculation we will assume that only source are the transformer and the motor connected to the system the motor are connected in parallel with the transformer as an impedance with an infinite bus as the source of the fault current
- short circuit current= driving voltage /total impedance (ohm,
A point -to- calculation of short circuit current available at any point can using it the basic used per unit calcul short circuit
-value in electric power circuit the reactance of the utility systeme must be assumed zero ,and the following
-approximate transformer per - unit ,Z=(%Z)(base KVA)÷(100)(transfo KVA)
Base KVA = transfo KVA
Per - unit Z,of t transformer=%Z/100
The basic formuler calculating short circuit current when per unit ,
RMS ,sym = base KVA ÷ (1,73×kv×(per - unit Z of the transformer.
KVA = transformer KVA and transform ,KVA ÷ (1,73×kv)load current for three phase transfo ,
ISC ,RMS ,sym= transformer ,FLA÷(%Z÷100)
-Transformers flat = 1500Kva÷(48×1,73)FLA=1,80,
ISC,RMS,y=33,955am

-the rotor construction to fault by single or group of low voltage induction motor can approximately five time the motor full load current this because the reactance of a low,voltage induction motor , including the made as above for a transfo motor load ,75% of transformer rating rating was give ,motor FLA,
1,806×75=1,355Amp, < I,c RMS ,sym = 1,355×5=6775 amp
-total short circuit current available point fault the total of the contribution from the transformer plus , construction for the ,
Total ,I,c RMS , sym = 33,955+6775

4.8 Explain :Lightning: ,2 method ligthning levels in a space the lumen or zonal cavity method and the point by point ,zone cavity method is using calculate the average foot candle level with the space ,point by point method predict illumination for a specific visual task
-design a lighting system for a room 15feet×25feet with a ,11 foot curling that will be used for general office work ,the ceiling will be lay - in - ceiling title and the walls will be ,painted off white the luminaire will be cleaned regulation and lamps will group replaced when the first failure start occure,
-Foot candles = total lumens striking area÷area
-Foot candles ° lamps × (lumens ÷lamp)×cu×LLF÷area
Cu= coefficient of utilisation, LLf = light loss factor ,

PFC. 20
PCC. 80
PW. 70
RCR

Test No 7834, S/M=1.3
- the work plane height is the level at which most task performance
30 uncles , RCR= (2.5)(11-2.5)(2(15+25))÷(15)(25)=4,53
From the Cu ,table above see bold number ,the resultant cu must be interpolated between 9,55 and 0,50

100=No .for.lamps ×3150×0,523×0,75=15×25=no of lamps = 30,4@4 lamp
,-0,75 foot candle level,number of applications work ,level ,100foot candle,
- spacing across room = 15÷2 ,or about 8 feet
-between row and (15-8)÷2,,3,5 between wall and closer luminaire all dimensions are to centerlt.
- spacing length of room = 25÷4 , or 6 fleet,
-between luminaire in the row and (25π2,or ,,3,5 fleet room,the wall to the end luminaire.
-foot candles =(8×4)(3150×0,523×35÷15×25=105,4 foot candle.
-ligthing point by point calculation
-cable power distribution curve

4lamp

Angle. |End|. 45°. Cross
---
0. 3429. 3429. 3429

D=,, R=4, H=8,5'.
Foot candle (horizontal plane ,
-FC(h)=candle power ×cos π÷distance
-FC(v)=candle power ×sun π÷distance
Candle power(cap) is source in the direction of the rat , cos Q = height above task (H)÷ actual,distance from task (,D)
Sin Q =horizontal ,distance from task ,R÷D
D= √(H.H+R.R=√(8,5)(8,5)+(4)(4)=9,4
FC(h)=√3245×0,904)=33,2f
F=√(4)(4)+(6)(6)=7,2ft.
Cos ,Teta=H÷D=8,5÷9,4=0,904,,
Arccos (0,904)
-F°√4(4)+(6)(6)=7,2..f.t
Cos,Teta=8,5÷11,14=0,76,Teta =arc ,0,763=40,27
,45° respect luminaire ,35°, 45°,value use , 2420 candle power
FC= (2420×0,763)÷(11,14)exp2= 14,88 FC
- FC total = (33,2×2)++14,88×2)=96,16fc

- ground:
Cale pulling tension:
TM=0,008×n×cm
TM=maximum tension in pound ,
n= number of conductor in cable
CM= circulator mil area

T= length of duct [feet) × (weight of cable (lb per foot)×(coefficient of friction)
- R = T÷ 300, max pulling tension ,1000
Pounds cables pulled basket,300,time ,R= T/300,,T is the work

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Equipment heat load ,heater electrical losses estimated added to cooling requirements of the save energy y loss for number of type of electrical equipment .
Losses in electrical equipment

Components.| Percent ,energy,loss full L

-meduim. | 0,005-0,02
voltage.
switchgear
- transformers |0,4-1,90
-meduim. |0,02-0,15
Voltage
Starter.
-low,volt
Switch gear. |0,13-0,34
-low volt
Motor control| 0,100-0,49
-cable.
-motor
-1-10hp. | 14.0-350
10-200hp. |5.00-12 .0
200-150ho. |4.0-7.00
Static |500-15.0

Variable
Speed drive

...

Section 5.

Assessment moderator , learning and teach ..

5.1 Explain: teaching modules material balance energy and heat transfer.
5.2-engineering systeme.
- dimension of mass flux mass flow per unit area perpendicular to flow .
G=1/A×dm÷dt.
Dimension are M÷L.L.t
6f.t+10°c
5.-1.3 conversion of units
-5.1.4 . process and process variables operationel or series of operation particule , objective is accomplished.
Operation involving a physical or chemical charge in a substance or mixture of substance material a process an input or feed ,leaves is the output or product ,process variables associated through input or output of a process stream .
-construction

Draw of simple block flow diagram representing ,calculate the Quantity of mass ,or mass flow rate ,volume ,or volumetric flow rate miles flow rate ,
-explain , gram mole ,lb and ,at least two density and molar mass ,
- explain : the meaning of gram - mole Lb
- least two methods of measuring .
- convert a pressure .
Convert amount .
- process is any operation or Serie of operatio that cause physical or chemical change
-process , input fees yes ,process yes, output product,
Process variables ,temperature pressure flow rate composite.

-Mass and volume substance ,kg /m.cube, g/m cube, Lb.ft
Calcul the density of mercury in Lb/Fr, tabulated specific gravity of Mercure in lb ft from tabulated specific calculate volume ,specific gravity of mercury at 20° ,
PHg =SG×pref
= @3,545×62,43Lb/ft ,exo 3
Volume= 215 kg | Lbm. |ft exp 3
|0,454kg|45.67Lb

- flow rate process involves the movement of material from one point to another the rate which material is transported flow rate of material the flow rate of process stream be mass flow
Or volumetric flow
m,kg , fluid
V,mcub fluid
u (m/s,
m=P.v,,
m=P.v
Average linear velocity ,u= v/ A=m Moli flow rate ,n= m÷ M.. weight,,
M= molar mass (molecular.
-chemical composition , material in natural in chemistry process system are mixture of various species,
-physical properties of a mixture strongly on the mixture composition.
.-moles and molecular weight: atomic weight of elements is the mass of an atom.
Moles and motor mass , moles ,n=mass÷molar mass=m÷M
- carbon monoxide (co) has a molecular weight of 28,1 mol of c there contains ,28g ,Lb mole contin ,@ ton - mole contain ,28 ton factor used ,

100g.CO2| mol CO2

| 4401gC02
-mass and roles fraction process stream occasionally contain on substance , mixture of liquid or gases mass fraction ,mass of components per unit mass of total , mixture ,XA=mass of A÷ total mass (kgA÷kf total , or gA÷gtotL ,or LbmA÷ Lbm totaj
-yA=moles of Aπ total roles (kmol A ÷ kmol total ,or mol A ÷ mol total total
- solutions containing contain 15%, by mass (xa = 0,15) and 20mole%, B (vb= 0,29) ,a calculate the mass of A ,in @74 kg ,solite
-15kg solutions | 0,15kg A
---=26,25kg,A
| Kg solutions .
- b ,calculate the mass flow rate of A in a stream of solutions flowing at rate of 53 Lb/h
53Lb| 0,15 LbA
---= 7,95 LbA/g
H. | Lb

C) calculate the molar flow rate B in stream flowing a rate of ,1000 mol

- 1000mol|0,2molB
---=200mokB/min
Min |. Mol
-calculate total solution flow rate that corresponds to a molar flow rate of 28 kmol B /s .

28kmol B. | 1kmol solutions=140kmol

|0,2 mol B
-calcul mass of the solution that contains ,300 Lb f
300LbA. | 1Lb solutions
----------=2000Lb
|0,15 LbA
- concentration the mass concentration of a component of a mixture or solution is the mass of this components per unit ,volume of the mixture .
-mass concentration=mass of components or solite ÷volume of mixture or solution = g÷cm,Lb/ft,exo 3 ,kg
- the molar concentration of components is the number of moles the components per unit volume of the mixture.
Molar concentration = moles of component solutions ÷volume of mixture or solution= (mol /cm cube,lv-mole/ft,exp 3
-the molarity of solutions is the value the molar concentration of the solute expire ,
Molarity= moles of solute ÷ volume in liter of solutions = mol
Molar a aue ,solution sulfuric acids flow into a process unit a rate of ,1,25 m cube /mib the ,specific gravity of solutions is ,1,03 and molecular weight of sulfuric acids is 97,08
a),the mass concentration of ,H2So4,in kg
/m,cube ,=0,5mol.h2so4÷L×98g÷mol×1kg÷1000g×1000L÷1m,cub=49kf,H2So4.
b)the mass flow rate of H2So4.
=49kgh2So4÷m3×1,25meter cube ÷mib×1mib÷69=1,02kgh2so4is

...

section 6

6.-explain: proposed gate RL, architecture ,
A. Proposed gate RL, systeme is based the RL, methodology that consists of agent and environment agent send ,to the environment add new connection to the schemat to environmental add new connection to the schematic ,envit update ,state (St+1) reward (et+1) and mask (Mt+1),transfer them to the again ,RL network ,gate RL ,make action masking

-mask ,Mt,Mt+1,, reward,r1,r1+1,, agent, thrust, environment,,action
-is extracted connection matrix (cM) that is similar to and adjacent matrix graph their all possible node schematic are equally assigned ,now ,CM ,shaa of square ,matrix ,N1,No,Nn,and No,are number of input , output ,n type ,Mo's (NMOs) transistor and P type Most ,(PMos) transist ,respective ,total number of columns ,or row ,Ncm can be connected to suppi voli source of VDD and GND ,,in particular transistt have ,three termit of (s) gate ,and draw ,D ,the number of their nodes are calculated by means ,number of transistor factor factor of ,3 the connection body are omitted..
-transistir are fixed GND ,and VdD , respective from the node assigned to I th row ,or colour ,is address as ,the odd ,(@=1,2,...
NCM=2+N1+No+3Nn+3NP.
.
Drawn..

-6.1 connection Matrix (cM) configuration ,C m ,an element of CM at ,ith row the Colum (I j) ,is assigned to ,00@,mean connection.
N1,No,Nb ,and ,No ,are ,1,1,1 and in addeditiin ,connect in the circt schematic are indirect ,CM ,is constructed , symmetrical matrix..

- state ,stmmt CM does not allow self connectiin VDD,GND ,input and output ,the marked. Information ,(s) ,into state vector (t) ,22mask (Mt) ,
m,0 if available , connection between node I and ,node j if , in = (1, prohibited connected bett node

I ,and node .

- CM ° (in) she < I < NCM j NCM , without connection node ,I and node j , C in = { with connection between node I and node j ..

Drawn
-6.2 extraction connection of circuy element ,constray direct connection bett
VDD,GND,,iNPut,output ,must sout and to connection of circuit.
- circuit least diagonal elements (ci ,,I= @,#,NCM(,fixed at all the time , symmetrical matrix the full matrix can be reconstructed ,half area ,shape ,
-circuit leading to the diago elements ,(CIR ,I= 1,2,N , reshaped ,into St ,in a form of a vectt by flattu it length (Na) is calculated ,dividing rectangular .
(3Nn+3Np-1)(3Nn+3Bp),exp 2.
=(2+Ni+No)(3Nn+3Np)+_____'''=Na
3(Nn+No)(3Nn+3Np+2(2+NI+No)-1.exp=
3(Nn+No)(NcM+Ni+No+1)

-draw maskit matrix (MM) generated with , VDD,GND ,input , output ,node ,terminals is connect to VDD ,GND ,or input ,termit ,the ..

-marking t exit connection ,
- marking connection bett VDD, GND,,inp ,
- marking connection ,via a transistor between VD,D marking connection of single both source draws ,
- mask generation scheme base on a given CM ,N ,M generated according to four masking criyert the red is of matrices middle are exit connection ,CM ,blue is are possible , connection via other node ,each masking criterion finally ,two vectors of St and Mt ,are produced by flattening the upper right region ,CM,,and ,MM respective,,

-rewa

...

-6.2 reward (t) since proposed gate RL ,simple defined,+1 correctly workings schematic ,-1 other expected the gate ,RL proposes the working schemat Witt the minit , number of connections steps minimum
- inverter combination two point , combination of two input (N1,N2) target out (out) ,case of -1 and +1 the four row composed aget , support two logic gate such and ,and ,or ,nor
-gate ,RL framework ,level of VDD low GND,,

.draw

-keep one input gate ,N2,high impedance ,0,1 is VDD ,and -1 , GND verification is conducted ,CMos transisi ideal switches andP MOs ,complt gate value ,+1 and -1 respectively over ,first a vectt (SV) of the size ,of 3 Nn + 3 N p, initiation

Draw.

6.3Verification step inverted ,are matched to target output ,out ,is decide as ,1,
Action (t) .
Agent is implemented by deep ,A- network (D AN) 4,fully , connected network (C1 FF) ,C 2,C3,C,4 takes concentration ,St and t as the input layer x is the flattened ,vectt give, range ,St value is charge from ,T activities rectifier linear units (Telus) ,C @,C,2,C,3
Scale ,(B) is struct , guarantee to mask , element,is decide selecting position of maximum output , org max ,function with respect to action

X= concatenate (2.st-1),b FC 1= rely (w1.x+1).b
fc2= rely (w 2.fc1+2).b fc3.= Rely(w3.fc2+3)/bfc4=w4.fc3+a,t=orgmax (fc4,B.Mt)

Draw , ..
DAN Struct it deal with concatenation of St and T as an input layer the range of ,St elemu from ,0 to @ ,is extendt from -1 to ,in order to be matched ,
- elements from 0 to 1 ,is extent,
T,t and RT +@, return (GT) at ,St revised replaced appended to replay buffer ,changing R ,to address ,all target logic gates , agent ,DQN, mini batches,
- D QN ,funct ,W is weight and biases , is the discounting facty and the learning rate ,
L= sum + sum + G(St ,T,t) ,2 ..
------_____
- algorithm ,DQN
1:for each episode do
2:for each t dib
3:
Initialize CM,I
,aegma.
€:t
and Mt,with probability ,a { Q(St,T,a)-BMt},and Mt,or Mt

,2.1 ens for ,
2.2 end if .
23: end for

...

7. Explain: part stared in electronics ,from electrons ,to electronics , keeping humans ,gadge safe ,
- components shack ,stocking up outffiting your electronic bench
- getting common electronic components
- filling out your part bin
- putting on papper.
- reading a schematic
- underst the basic of electronics circuit .
7.1.4. Getting , soldering ,making friend with your multimeter , getting down with logic ,probes and oscillated ,
.
- part pletira of project ,
- creating your own bread board circut ,
Built your own printed circuit board ,
- the exciting world ,if microtrollee ,great project you can build ,30 ,
* Ten cook electronics testing tools tips .
- ten great electronics part source ,ten electronics formuler

_____
- parted getting started in , +5volt ,0 volt ,signal ,volt signal ,DC square wave
To be come electronics decide wath to build create board Brea circuit jump right in to project
- discovery circuit ,team ling ,
- play with tools to build thing
play w

- if you design a circuit you want building thing make more get soldering pencil ,also called a soldering iron ,the elements of a circuit together choice a soldering pencil.
- you work with project,no doubt other miscellaneous tools pop up that you may ,want you can use ,magnet to retrr screw and other work bench
- tools to measure thing ,
- unitt smiles and bigget .
- current ,OA,nA,mA,uA,A
- inductance ,: Ng,mhuh,h
+5 volt
9 volt with capacitor with caoacit ,
- understand ohm low ,wee wiring a circuit sat know the amount current that the components can with stand blowing up ,how .
V'=I×R.
Taking ohm low father ,I= C/R,,R= V)U,
I= V/E=12/8,= Colts /ohm=1,3 Amo.
-the pou of ohms low ,O= V×i
- can use equation to calcul the power by the buzzer in previous,
O=12volt × 0,095:Amp = 0,962 watt
And you thoug Mrs ,what sir wasted your time in algebra all years , because ,V= i×E,you substit ,I×R, ,you can to rearrange the equat for lower show how ,gadgt sage ,
& Six sens of electronics isn dead people living common sense is that voice inside ,never assumed always double check ,pretend that your soldering bpencik is out get your burn or electrocute your self .
- if your not sure about how to do something read up on it firs , everything in electronics , take chance make ,40/59 something is plugged
& Danger of electrical shock ,electricity = voltage + current
- components shack : stocking up
Our fiting your electronics bent
- take it off wire cutter and stripper name off the wire plastt insulation.
- gettt a grip wit needle - noses pliee ,stripes bend wire and hold pasrus ,place during project assembt for intricat work ,use ,5 - inch needle ,nosed pair of pliers such as jewellery makers usedarger pliers ,such general purpose work ,way the size of the pliers reflection the overall dimensions.
- magniful ,alligator ,nilkon trim cutter wire flush .place for everything and everything in it place .

- filling out the box time to time you workshop tools when construction an electronics project .
- probably need a saw or drill building motorized ghost display ,don't thing you have to rush out an by one evry tools .
- Clow homer ,: used for just about anything you can thing ,.
- rubber mallet : for gently bastinf piece together ,hacrsaw to cur any.
- miter box , to make anled cut with you back saw mete box include ,a 3-4 flat where your place .
Adjustable wrenches ,sometime crescent ,locking pliers ,such a vice grip ,the lockit ,nechanist help hold piece for cuttt sand ,but driver tools ,make it easy it , easy for machine screw ,
Measure tape ,get cheap cloth tape at fabrication store ,
File assortment ,use these file to smoothly the dough.edge of cur wood ,metal and ,plastic.miniature files at the hobby store,.
- drilling motor , working with metal and plastic.
- drill bik fly duty in Tricare work Hans ,operated electronic ,
Drill bit assortment.vixe safer clear

...

[

- explain: transistor, on the case of transistor plastic or metal , size matter ,
Condensate always observed the polarity marking on capacitor , changing capacitance .
- diode semiconductor use control flow of electronics semi conductor a diode had two terminals.
- zener ,ligth , emitting diode silicone controller rectifier.

,- rectifier ,brigth.
- AC, input ,DC out put ,PIV , rating rougth indicate the maximum working voltage ,diode rated 100volt , current rating is the maximum amount of current the diode withstand ,3 Am ,
-diode are identified industry standard numerical , systemnclasic is the IN 400 rectifier diode which rated rated out ,2.0 PIV ,and 50volts A,1N4002 is rated at 100volt ,IN ,4003 rated at 200volt and , which way ,
- resistor , meeting LEDs,
- circuit voltage | current limiting
 3.3 to 5 volt. | 330ohms
6to 9volt. | 560ogm
12to 25 volt | 1kohm

-R=(vs-vf)/if..
R: resistance.
Vs: represent supply voltage ,voltage,
VF: drop Led.
If: in Amps

- 7.3explain packing parts together on integrated circuit discret component mean separate Icb.
-linear digital or combination plate lineare ,connection required:
Call pins
number counter clockwise,IC-14pin,IC
Clocking mark : IC pin number counter clockwise , sequence staring from the upper left the clocking notch orientation the child ,at the ,12h 0' posit.

-Filing out your parts pin
- picking the perfect type of wire powering up with batteries and solar cells , flipping switch , controlling output with logic gates , tuning signal with inductor and crystal ,marking Sens of things with sensor , exploring how DC motor working ,making some wmaking connection
Components schact stacking up .
-marking connection : marking a circuit requirements that you connect component to allow electric current to flow between the the following sections describe wire cables and connectors that allows you to do just that
-wire use electronic project long strand of metal or copper ,on job cut open the cord of any old hold lamps make sure ..
Insulation .
-sizs matter wire ,
wire gauge /wire diameter
16. /0,051
30. /0,01

-color.
Making connections with connector typical cable ,call socket or jack ,pins and holes connect the appropriate wire in the cable to corresponding wire in the device.
Cable to the corresponding wire in the device.
- connector run into electronics a terminal and terminal
Block work together type block attachments block to the case chassis project solder crimping a wire to terminal each .
- to connect terminal wire pic a pair of screws and connect.
The terminal each wire tone those screws.early project

-powering up : all wire and connectors have a power source building a project nee Voltage and current thing get power ,from wall outlet we talk about plugging in wall outlet , batteries solder .

-electromechamicsl reaction process turning juice.
- starting you everyday type batteries that ,supermarket ,AAA,AA,C ,D ,size batteries all produce about ,2,5 volt compare to the transistor battery ,(little , rectangular.
Negative terminal ,,positive terminal,, rechargeable.

- zinc - carbon ,alkaline ,nickel ,-cadmium , Ni cad ,Nicad,

- Nickel - metal hydride (Ni-MH). lithium

Drawn

-turning electricity on and off : switch disconnected wire the batteries run from the batteries to ligth bulb , connection wire to allow electric current to flow or disconnect wire
Toggle ,rocker and slide switch ,dobsame job , switch works well array ,

- hand held flash light because of the position of your.
- thumb ,but a toggle switch may work best to flip on a gadget sitting on your workbench
- want to see le of switch in action ,#5 described you used leaf switch , normally closed (NC) ,push - button switch disconnected ,wire only when you push the button .
- normally open (No) , this push - button switch connect the wire .
- push on push off (button ,this switch connector the wire.
-wath inside a switch ,call basic switch that we talk previous , section single ,pole
single ,throw,SPST,,types ,
- single - pole double - throw (SPDT) one wire come in two wire leave , green ligth to let people.
- double ,pole single through (DPST) ,two coming into control two separate circuit , running on 5 volt another ,
-double , pole double ,throw (DPDT)..

LEt a relay flip the switch : simple electrically power .
gadget 5 vol, 117volys power ..

Out put wire , 5,12,or ,24 vdc to power ..

7.5-make decisions with logic gate : play
Comput ,or input invert / input / output

_____
And gate input /output

Input A. Input B. Output

Low
High

- vibration with DC motor
Speaking of sleeker
Building super duper
Buzzer noise get.

-understanding the roles of of schematic getting to know the most Comme ,using and not busing components polarity

-what schema to be care , schematic serve main purpose
Show to reproduce a circuit shown you can build the circuit shown interconnection ,give you overview of of a circuit so that you can better understand how it works, discovery how to read little learn foreign language.

-symbol power ground ,line horizontal , ,117 VAC , outlet DC , battery low ,no ground symbol metal

chassis ,,
Make Laball DRA

-connect ,unconnect ,,,jack plugs ,and connector , miscellaneous

- basic circuit electronics: series circuit , parallel you can connect if you,

RT=1÷1/220+1/33+1/10+1/330=7,2ohm ,
I=V/R=9volt/7,2=1,25Am

-voltage dropped across R1=R2/R1+R2×Vt=220÷330×9V=6v.
Bout = Vin -VR2=9volt - 6 volt = 3 volt ,I = ,V/R=2/1=2a.
Team building of basic block of electronics circuit , such as , time constant ,= constant = R×C = 2000,ohm × 0,0000015 farad = 30 sec ..

- using transtor is a switch , boosting ,thing with a basic amplifier .

-An operational amplifier ,IC , op Amol .
Gan = R2/R1.

-R2' is ,10 times ,R 1, the gain is ,10 ,this gain result in a ,2 - volt input signal producing a ,10-volt out signal .
- An op - amp both negative and positive supply voltage .
Range ,8 to 12 volt negative supply voltage in range ,8 to - 12 work

...

-7.6 integrated circuit: ,
A,555 timer IC wred into a circuit make more of less ,pin number you used ,connects to pin 8 which ,power and pin 4,which ground connect to pin 1,the output of IC ,St pin
-filing pin 2,and 6,pin 7 , discharge,R2 and R 2,
T1=(R1+R2)×c , T= (R2)×c.

7.8-solder getting industries :
Soldering tools.
Soldering pencil pencil insulating tips iron takes,soldering pencing ,stand solder ,
- solder hardware,
- wettedspongr ,sipping off excess solder ,
-4×to6×magnifying glass for inspecting your work.
Solder sucker , removing excess ,solder.
-rosin flux remover available in a battle ..
* Third hand ..

- making friend with multimeter.
Basic multimeter ,valt metr (VoM) is the basic tools for test measure AC voltage measurement resistance , measure current going through a circuit measure continuity
Digital analogue,
electronics 12bit.
Discrete step ,step can take any analoi signal circuit , Meyer manufacture select,
Manuel
DC volt ,1000v,AC volt500v ,DC current 200mA, resistance ,2mohn ,

Test output voltage ,, supply voltage ,test switch ,test resistor capacitor ,
Logic probe use ligth to indicate a low or high sign ,logic led indicator,

Testing the frequency of AC ,60 Hz ,50 Hz

2/period = frequently,
2/1,6=0,625 ,see time phototransistor wave for ,span ,, 0,8 a division , 120 flash ,,1/0,80= 125..

- Pletorate : project couple of circuit board constructy point - to - point wiring , wrapping ,
Taking a look at soldering ,bread band ,styless,
- title silver,metal connect , resistor , capacitor,transistor,IC
Bread board consider of columns that connect electrical
- Pre , stripper wires.
Building your own printed circuit board .
- printed circuit board is mode of copper and on insulating
- finished PCB , use pools for soldering on components and traces in place of wiring .

-manufacture make circuit board .
- first the coal the copper with a ligth , sensitive chemical layer called the sensitizer know a resistor ,Photo resistor
-;next the place exact ,size film negat of t circuit board layout drawings over copper clad expose ,expose ,processing board in ligtg in case strong ultraviolet light..

-after exposing the board the dip it in resistance development this messy stuff but a necesst , development copper turned black or a dark Gray positive .

_as final step they dip the board in etchant ,
- step build choosing right copper clad material that you to make ,printed circuit cladding square ,35 micro metre ,cutting and cleaning board use make PCB ,

-created PcB , photographic.
Prepared a mask of circuitayout and transfer it on clear transparent film variety of methods as description section.

- use mask to expose a sheet of sentived strong .
- dip the sensitizer,exposed sheet into a development.
- submerged the copper sheet,tray of .
Flip flop create

-ligthing effect projector...

- cool robot project to amaze :
Rover robot list ,
Bottom deck ,cut to size ,top deck,cut to size ,2 Tanya ,worm gear motor (model ,#72004)
- 2.tamya narrow wheel sets (model # 70144)
1.1/4 inch swivel casters ,26-32 by ,1/2 inch machine screw ,26-36 nuts for caster ,4 risers , constructed with stand , 6-32 machine screw , 2 DPDTcentre ,
- 4 - cell ,AA batteries ,smaller wooden or plastic,board (for mounting the switch a battery ,20 to 25 feet of flexibility lamp ,also call ,zip ,solder electrical tape..

-make draw LED flash circuit,detector infrarect,police siren ,alarm schematic,,amp

Ic1: LM 555 timer ,IC ,
Q1:2N3906,PnP transistor
R1: 100k potentiometer
R2:,3,9 Kohn resistor
R3:20,ohm resistor
R4:47,Kohn resistor
C1,C3,0,2-uf

C2: ,,1.0 if ,,0,5

...

[

-7.9.explain: .the bits and pieces of a bit .you don't have to make your robot body elaborate to make it Google body elaborate make a simple and shirdy body by using common tools and readily available material simple can building square shaped body more easily .
-introducing rover the robot .
-fairly simple robot that gives perfect intro to robot building just staring .
,- in the basic rover ,use two small DC gear motor to control it's movement ,by using a pair motor to control it's movement ,by using a pair of wired switches gear motor motor are like regular motor , except they also of gears that make the motor more ,propelling the switch down up and down its lot more fun that if sound especially if have car dog to chose around don't worry no animal will be harmed during this project .
- the advance rover use a microcontroller , specifically e basic stamp 2,to building self contained autonomous robot , with verst your program the microcontroller for what you won't rover to do this smart rover uses specialised motor that you have to take operate and and modify you ,
,-;preparing to building the bot .
Befot you can drill your first Hade or fasten your first but ,you need to layout design of your robot ,acquire LL the material and sort.

-first get your self a template.
Although you use a circuit schematic for simple projects ,you graduate to something called ,a cutting and drilling template for making a robot this template as the layout for your robot draw the layout scale ,that the size and shape that you want the finished piece to ,-be-on a piece of paper.

- the cuttt and drilling template for river two - deck tablet robot the dimensions used .in this template are measure.
Inch the template include the two body piece we call decks ,like the decks of a ship ,there s a bottom deck and top deck ,you attach ,the motor wheel to the bottom decks ,top deck is left free for future enhancement such an add ..

Draw ,

Gathering your material rudimentary construction skill to build rover using .

- 1/4inch hardwood plywood ,a good choice ,is 5-ply our craft plywood available at any hobby store
-1/4 inch rigid plastic you can this plastic Stores.
- if you re nor careful , acrylic can shaftle when you re drilling or cutting IL.
- acrylic drill tools Mather quickly
-acrylix generate a ton of static electricity.
-gating piece : machine screws size.
When using stand off as rises the minimum length that you can use ,2/2 inch ,1-or,1.1/2 inch standoff work.
- if you re using machine screw distance between deck piece plus thickness of the deck piece , material thickness of the retaining nut ,want inch. Of clearance and you 're using 2/4inch thick wook ,or PVC ,the machine screws must .

- building the body of the bot plan material in hand actually start construction,so put on you your hard ,and ,oh don't forget .

- cutting and drilling the piece of robot body first step building process is to use the robot layout from , fig ,,15-1to drill holes for mounting parts and the cut the deck piece .

- layout the holes and cutting dimension from the template ,15-1 directly wood or plastic material on better yet draw the m first on a piece of papper the tape paper over the wood or plastic material.

-when all look right ,drill holes for rover using a 2/8,inch drill bik , not drill Manuel,drill press Helt accurate holes.

-after you finish drilling cut the piece to size used hacsiw ,coping saw jigsaw ,band saw it prove control

-sand Draw the cornea of the piece to produce bevels edge more sharp angle at each corner cut rover .

- Assembling and mounting the motor set a side the body piece for now and turn to assembling the two gear motor you put these motor together by following the instructions your motor Phillips screw drivers to assemble the motor note that the screw driver does come in the kit si you need to buy one if you don't already have need small hex key wrench ,attach motor ..
- a Tamiya gear motor.
- asssmbled and ready to go .
- the motor attach to the bottom deck of rover by using small screw.

- doing a shells : with motor attached its times to secure the wheel in place putting the shell for little robot buddly ,involve step mounting on axle to gear motor and attaching the wheels to that axel .
-2axle in the gear motor kit , build your robot ,
Model number 70145 ,two 57 millimetres diameter rubber tire about ,2.1/2 incht
- attach the two motor ,the robot using ,4-40 by ,2/2 inch machine screw and ,4-40nuts ,15-6
- mounting the caster : swivel casters support base robot located opposite the gear motor standard, 1.1/4 inch located opposite the gear motor standard.

1.1/4 inch ball - bearing caster :
A you attach caster by usit ,6-32 by ,1/2 inch machine screw and need the drilling holes in the layout and spacing depending on the model of castle .

- adding the second deck.

- t fireshed but not . ,smart rover with wheel and a second b.
- control switch gone through preceding section completed your rover assembly firing .

- diagram shows you how to hook up a battery to two double pole double throw ,toggle switches this diagram wire the switches so that flipping a switch forward power motor one way flipping.

- following the step to hook up the battery I .
- 1 solder a 8 to 10 foot length of lamp card wire from the center terminal of each switch to left and right motor of the rover .

-2 solder the leads from 4,cell AA ,battery holder the red wire and the black wire from battery ,to the terminals on both switch .

- connect to battery to control switch then connect the switch to motor..
- solder the remaining grimper between the switch terminal as ..
-the jumpers from an x shop ,when you wire in this way ,the switch revers polarity of the voltage from the battery as you toggle them.

-;drill two ,3/8" ,(or so) hole in piece of 4'×4"×✓,1/4" plastic or whole allowed place underneath ,size of hole depend on the mountinf requirements of switch using should be just large .

-use the retaining that come with switches to secure the switches to the plastic or wood.

- place the switches in their center /odd position .

- put for AA, batteries in the batteries holder .
- use tape (electrical tape or duct tape works bet to security battery holder to the piece of plastic or wood.

- tuck ,some of the wire leading from the switch to the robot inside the tape acting , switch backwards bto reverse direction.
-driving miss rover .
- make your robot turn buy pushing one switch forward.

Steer by direction ..forward,reverse,right turn ,left turn ,hand right turn ,hand left ,

- DC motor out ,R,/C servo motor in .
A typical standard size ,R/C servo motor

- shoppt for servi . Manufacture of R/c servo motor inf servo motor for robot.
- Futaba ,S148,ground wiring servo (GW's) S03, and ,S05,gitec ,HS - 422.

- making servo serviceable , manufacture ,90° , modified on R/c servo .

- sensing thing with a bumper switch piano ..
- many leaf switch are SPDT,they have ,3 terminal common , normally open (no) normally closed (NC) terminal work well ,no normally.

- putting a switch on the front of your robot .
Connecting up to the board of education

You almost have working smart youe now ready to connect the servo ,Wich mount on the rover as described in the section mounting servo ,earlier basic stamp board of education you can check out the overall connection..

- steobdigrame of servi connection to be,
Servi black and ,basic stamp board Education yes .

- you use I,/O part ,12 communicate between to BoE ,servi ,part 13,is located on line 17 and ,part ,14 is located pin ,19 basic stamp 2,chip ,note pin number for .
4 corner pins are indicated ,basic stamp ,I/On..

- making switch and power connector sensing thing bumper car switch servo than ,9 v batteries,4AA
-

...

- driller ,Moller , mirror.
Cad software circuit ,involve layout and drawinf line represent wire pin ,nest you run ,mule check (ERC) clicking

Draw

Exciting of micro controller , exploring how microtrollers works, getting into microtrollers running down micro controller for students .
Taking a closer look at some microcontroller .

- small computer : horse power
Non volatile memory ,store the program ,run computer in non volatile stick. Life connected battery , input out part ,connecty a microcontroller communicae real running motor relay sensor. Switches liquid crystal display microcontroller input , output part ,I/O part info ..
- mind start Lego robot ,search brigthtesr ligtg in the room flasiled find the bright esr light and ,react ,to bumper find mounted ,sense a black line piece of white .

-program micro cont language assembly language understand recommend assembt .
- high level language ,98% PC crease language.
Tasting basic stamp ,1,2 parallax web version software for use with ms do's .

- introduction the oO pic :

Making circuit .basic stamp ,I/o,,pin
Stamp bs2,
High pin o high the led turn on pouse ,250 with ,250 milliseconds ,low O ,pin a low the led turn off ,pause ,259 waiting ,250 milliseconds goti loop : loop forever ..

- long ,tells the editor wath kind of basic stamp you using ,use

- line ,2 this what you call label later ,g in progress line,.
- line 3,high o turn ,I/0 pin on makes it high ,because the led conection to I/O pin ,O this line turn the led on .
- line4 : pause 250 make the basic stamp pause for 250 milliseconds .
- line 5 : low O turn I/Obpib off (make ,low) .
- line ,pause ,250 makes ,basic stamp pause again ,
- line ,7 gate loop tell the basic stamp to get labell.

- stamp output ,set pin as output for btn var but ,define ,btn as variable ,loop
- button ,@,0,255,250,btn,o,onoswitcg check ,
Out ° btn ,,turn led on if switch was triggered
-pauss ,150 waiting 159 milliseconds
-outo=0' turn led off
No switch Goto loop

- resistor in Serie.
RT= R1+R2+R+3
RT= R1+R2/R1+R2.

RT= 1/1R1+1/R2+1R2..

Capacity parallel
CT= C1+C2+C3
CT= C1×C2/C1+C2..

CT= 1/1/C1+1/c2+1/C3..

,Energy= P× t

R.c = p×t

RC .cost ..
TR.C ..
Freq= 300000/wave lent.

Wave signage = 30000.0/free

----------_----------
Making the smart rover
Program start both servo propelling the robot forward.
- if the robot hit something impact trigger the switch and the programmation revers ones of the motor .
- the program reverse that motor for about putting t program in place ..
You need connect you PC to the board of education USB cable depending on the BOE.
- { $ stamp Bs2}
Output 0
Btn VAR byte : set button variable .
Can't VAR byte : set for / next variable loop .
- pulsout 12,1000 motor A ,
Pulsout   14,500 ,motor B
Pause.   15 ,w out ,15 millise cans
- button ,1,0, 255,250 ,btn ,o,no switch

Out of = btn , turn led on
- for can't = 1 to 50 , count to 50 iteration
- pulsout 12,1000. , motor A
-pulsout   14,1000 ,motor B
Pause ,15 waiting , 15 milliseconds.
Next ,auto turn led no switch go to loop repeat how loop taking closer look how ,this line tell basic stamp editor that output..

Resource ,: www discovery circuit .com

...

7.10. Explain explain ,
The electronics formuler , putting ohm s low to work.
- calculating resistance and capacitance.
- finding the time and power to calculated energy.
- laying down some time constants .
- introducing frequency low.
P= I.R ,, I= V/R,,, P= V.I ..
I the current ,Amp lead ,20 MA ,respnabolty value almost ,led ,low value make for a din ligth higher value ,much because Express in amp , become a fractional number , 0,020 mA become fractional number ,0,020 Am ..
.190 ohm = 3,8 volt /0,020

Explain:education career center. , psychopedagogie learn teach ,council trade quality,education technology ,education , Education engineering training,and train training personal training engineering,facilitator engineering, assessor moderator engineering.
-post work training and education
Education technology
Education power electrical, education machine teach personal ,education control ,project

-Psychometric career assessor form personal talent CVS : hr

Reward ,award in the job
Position appointment Eskom city lower ,senior training trainer generator ,power station

:safety security ,advisor training ,policy training ,

Employment contractor subcontractor career material , framework qualifications training post ,artisan and office :
Course job tpm post product sale record file employees personal record booking training and product customer certificate issued , licensed
Outcome framework, engineering:
Research methods course overview report annuel tendered score employment:labour power :
Inspection training and product inspection exhibition outcome: engineering

-panel board license ,counter business marketing processing:
Correctional judgement reward:

.

section 12

Career education graduat , didactic evaluation assignment
objectivity :
Psychology career : power
Phylosophie logic civism
Teach career orientation
Management education ,.anagem t system skill admise
Education psycho
- training personal , facility training
Basic advance filling. Job career lost
Educare , .care maintenance daily.development cpd
professional insurance

Eskom and city power
Microsoft challenge skill:
Alison :
Scheneider:sustain topics exposing, library :
Eaton :
Scie bono .
Saqa record transcrip .
dhet career Kheta ,
Sars :

Human resources, training trainer , management :
Education technology:
Topics design engineer module engineering career experience :
Time table experiemental resources
Humain,resource materiel , formative ,Summative Assessment career
-module week, activities week ,
Exercise week experience work project
Material didactic: knowledge, application , scaling , career,
Mark sheet term ,
Performance : bulletin award mark reward.
Salary duty job ,record transcription

-Visited assessment experience:

-teach career ,log activities reflexion lesson plan career course module

Teach didactic material ,

,training trainer content personal workbased guidelines industrial
Week practice.

Topics compagny product training material resource ,,power Education machine education ,
control ,project management:

Hr code trade product advice license code product master form , eligibility product, regulation term issue livre ,power energy metering customer
Design energy ,week daily log activities

Performance permit ,, code power unity metering ,code component resource , identify I'd passport plate number code
Log activities, re design
...

10.1Explain , Microsoft compagny
-Learn product journey assessment.
- take challenge, badge ,MCIS:995847175.
-Badge 877,204 trophies , reputation 0 pane, accepted 0, falow,
-level:16-XP,1,38/325/1,481,088,
-activity : training , challenge, credentials,achiement,collection , transcript,
-module ,
-training get tips tric for teaching DP-100design implementation a data science solutions.
-learn test practices from Microsoft technical trainer.
- Microsoft learn for Education preparing for course delivery.
-microsoft learner for educator preparing for course,learn objective, introduction, explore objectives demonstrate,
Learn path best practices.
-explore best for practical.
- bringing it all together practice, knowledge lodge ,..
Lecons : lab ,1,2,3 run pipeline , azure machine learn performance ,hype parameter,rub pipe build , configuration,tank,file doc tips
-preparw to teach Al -900, fundamental in academic , introduction , discovery, understand objective domain,prepare for the examin exploration teach ,,

ID entra deployment
-One note path Microsoft path topics share poin presentation topics ,mac python Education,career asssessment
Classroom task assessment
Career hr Microsoft:reward Bing buy sale ,license meeting edge form

Lecture read memory ,, . Education PC,
Mother processor pin
-_____

10.11.Explain : Eaton engineering : job location .

- work type : hybrids department.
-travel rate : UPS , responsible .

- products digital services market support.
- article , brochure catalogs,competive ,3 D model application note , building information models ,
- information model.
- calculator Amp , specifications tools ,
- certification report design guides.
- policy private term,legal licence.
IECC: certificate class ,T30
- technical data 1115 ,Serie class

_____
Sr:|no|description|safety|equipment|test
|. |. | Prote| ref|name : cert
|. |. |. |. | Certificate

_____
-Aproval product ,
Bulletin : club -009
- date :
- bulletin type service:
-topic: new integrality cluct release product ,release
-issuee description corporation.
- application: certificate compliance .
Class division group
- manufacture location:. photometric- preferred ,process.
- installation process ,step recommend.
- instruction for installation operationel description operationel ,.
-exMinat certificate type ..
-------_____
Career , assessment Eaton hr. ,,note , survey form Eaton

Scheneider career ,product ,design
Innovation topics ,
Training ecoxustrure, sustainable
Video , assessment,
Transcript record ,take

-.**10.12 topics innovation research career path**
Assessment entry student in outcome base career continue developing professional, compagny, assessor TVET institut in assessor moderator experience compagny trainer

_____

design workbased methodology

research, learner LMS learner teaching process activities technical,
- factory system quality,LMS teacher TVET instituts work licensed under creative.
-: development LMS stakeholders understand the use LMS at TVET
Learn management system tools for delivery.
- LMS lecture evaluate track student progress ,web based ,Google classroom breaearch ,involved psychomotor,
LMS development: education technology online student on self ,:
- LMS base system functional ,
Adaptive delivery course process effectt ,valide accept b,item accept acceptance in TVET.

-:service ,quality ,expert view , components aimed at technology and the human dimension new factor ..
- adaption e, Portofilio management system technologie organisation, electronics system ,approach collected copies database , software satisfaction, performance,,
- Claude computing ability government role data facility exam ,study theoretical by filling a gap litterature ,key work,,
Outcome base Education b teacher leave ,lecture assist in preparing to achieve the student work enhance performance system computer hard software internet methode collection.
- teacher and learner performance former.
-data analyse after the survey were collected ,were process described analyse , investigation Novak conceptual measure v,,
-reliabiability instrument can gauge well performance preliminary research find the study cran back alpha measure consistent vamint same building, asssessment normal methode ,data are normally distribution,veriy,accuracy , validity measure creating method check ,GitHub azure test , measurements were normally distribution kurosis value ,test issue ,
- result obtained analyse Frome analyse ,
- profile GitHub azure demographic total variance ,

Components : initial Elena value , extraction sums of squared lodub.

- theoretical contribute study extend theoretical effective decision.adoptiojbin Education instituts make informed.

- practical contribution : contribute basic system adopted framework development vemployement clearly underline general roles in performance.
- limitations of the reseach ,study limited study in public sector instituts call cautt ,base evidence,variation.
-interactive lecture seminar tutorial, theoretical reseach base dialigut ,praticaj ,massive education,learning doing experimental, what's experimental doing , experimental design modej , learning environment,strengths weakness of experience v,
Importance of apprentisf a teach methode ,key feature ,college university apprentice.
- learning nurturing and socit reform model of teaching , nurturing perspective, social reform performance ,post and future relevance ,roles learner,,
Relating epismokogy ,online teach method ,live , classes using lecture capture ,course using LMS, limitation vclaasroom design model for LMS ,
- Addie modej ,wath addies ,online collaboration b,epstemolt,
- competency based learning :
What compenct based learn ,who use competency base learning, base industry apprentiship ,compiled .
- important teach learn . approach bloom design psychomotor skill ,
Video on theory of learning b,natural ,scenat ,Pre dinner ,art theory breaearch and best practices vin teach , theory of learning ,objective , behaviour,wath.
- communities of practice ,theories ,wath community practical blearb ,scenario ,
Stage one ,concrete experiemental,stage two concrete experiemental b, reflect ,abstra concetusj ,stage four active experience industrial bplacemebt , theory development, classroom teach theory in practice , methods epistemology,axisolofy,convenience piloting
_____&
Topics research : employees Poste
Trade lecture and learners trade theory in trade industrial trainer education ,outcom development skill,
-Compliance complain assess in order
Case study research investigation assesin order faciltor personal traine

- introduction
, problem statement ,
Purpose study ,back grong research ,
Research questions
Theoretical framework
Practical framework phylosophie
Methodology approach ,. population data generation ,analyse ,e,work integrated learning v,workplace learning, problem based learning, experience,TVET learn lecture ,concept, data present ,

Using circulum known ledge,learn civil engineering electrical skill , installation soft skill ,automation decoration materials recycle , program simulation industrial b, support ,bureaucracies,conclusion , promotion bcreativity,

_____
Job title trade assistant grade ,report to team leader .
Job purpose assistance general electrical ,support executive of work order general Durie
- prepare and maintain equipment tools and materials use ,
Demarcating of work area ,
Fetching equipment ,cleag site area before work execution errecting scalddolr movable immovable b,rigging to gain ,
Comply to safety health quality , requirements management program risk assessment risk work conducted ,execute general wirh that requires b,form time in support bdailt maintenance v
_____&___
Errors in marking guidelines.irregularity
Category of irregularity description b, guidelines bconductv

Subject bname assessment task,
assessment tool ,content coverage
Duration marks ,lecture
Test or assignment b,
Mark memo rebric , internal examination vcompletion post,.

_subject/ asssessment task: assignment test 2, internal examin action / Assessment tools marking, Content coverage: 89 %of practice compenent ,59, syllabus,70-80 syllabus..
memonrendum , duration ,date
-
-assessment task for natural science engineering:
Task : 1,2/
Time frame ,week 2-4:
Time week 5-8
Type of assessment activity duration proposes allocation ,test duration ,
Scope of assessment ,30% sylabu test ,/ contribute to icass trimest ,
...

.subject outcome : engineering science natural ,n studies electrique :

Subject	asses|ass. |cont. |durat|ass |Task. |took|cover| cov |. Date | Assign| mark | prati|> Test 2 | mark memo | 50% ,
Internal exN |.	

Mathematics, engineering science ,drawing engineering,electrical trade theory , industrial electronics, electrotech

Learn lecture senior
10.13 Assess task :
1.Task / time frame / type asssessment / scope /

Outcome basic network, advance :analyse
Outcome: theoretical practical workbased learning lecture training ,:generation transnission: Instrumentalion ,DC motor and generator , transformer ,three phase induction single phase motor , synchronous machine ,generation of electric, overheadt transmission underground cable ,stationery batteries ,electric energy economic ,methode ,
Activities: module base work outcome

2.Task fault ,a,b,c ,/assessment tools mark duration mark duration ,term /3 term ,100%mark,Location experimental

3.Task : Serie parallel ,Req=R@+R+R3+...
Task vab+VBc ./3term ,50%test,100%
Day ,semester
X

Metering instrument transfor measure

4.Task procedure calcul,impedance Z ,=√3.I
6.Task test for empire : reactance ,square
Task determine speed break ,n hors power ,T=k.flux ,IL
7.Task generation regulation=Ei
8.Task generating installed cost ,unit a,b
9.Task comparative of energy source and electric general, system,energy source
Configuration rating megawat.
10.Task .years occured ,forecast peak
 ,generating syst / generation system out .start motor quadrature
Substation bus.accumulation depreciy
Data unit a,unite b,unitec,
Value point ,point

11.Tasks: basic experience electrical ent,Ups ,sizing procedure general purpose service entrance conductor motor air conditioning ,load desin
Calculation/description/requiremen..t regulation,Cindy ,energy /c/phase

12.Task

13.Task teach module material balance
 energy heater transfer ,convert unity ,task process,energy balance close system final energy v,
14.Task basic conception heater transfer conduction conversation ,Q/A~.dt/DX..
15.Task mole moliculair,concentration,,
16.Task electronics components ,soldering
17.Task getting industries tools pencil.
Task part started task : from electron to electronics ,
18.Task keeping humain and goidge ,
19.Tash filling out your part ,
20.Task putting a schemay .task making friend ,
21.Task pletira of project ,creating bread board testing tools tips

22.Task robot rover

24.Task proposed gate RL architecture connection matric mask,reward r@+agent ,thru ,enviru ,Ction buffer/.
--_____

Development system software
Billeting ,week daily log activities

Task,1,x1,x,2,sum task variance ,model
X1,x,2,x3,x4,X5,x6,x7,x8,x9,x19,x11,,x12,x13,x14,x15,x16,x17,x18,x19,x20,21,x21,x22,x24,x

Model class module task , sum , average

Frequency, workbased career
Quartile,
Distribution marketing ..workase career
Battery:
Probability.ampl, dectior correlation .

Care take energy :
Psychometric criteria job :talent CVS
Averg assign total,grand faculty:

Psycho education
Pedagogie fundamental phenomelogic effect low rules workbased Education:
Effect stresses material break time table stop job dismissal reward ,: career successful:

-explanation mark allocation:
Measure of the spread of data ,data variance , deviations ,value mean
- x-u>, x-x',,
Avery population £=
n=24 , round ,age years registration grade students
X`=18+24,..... Average
_____

data |free| deviat| deviat| freq•| deviati
X. |1. |x-x'. |x-x'. | (f.) (x-x') Exp2
  |2. |
_____
Mean of frequency total
= Sum (fm)÷sum(f)
_____
Class |Freq | mid point | m 2|x, exp2|FM
0-2. |1. |. |.
3-6. |
_____
Histograms, distribution,
Student GPA,school,mean,.
S=√sum(x-x')÷n-1

Age | freq•| cumulative|
18. |N1. | 3+18=21
18. |N3. | 3+21=

-_____
Percentile. | Q3. | Mark
Q1,Q2,Q3,
1(FC+1/4),,,2(FC+1/4),,3(FC+1/4)

P(E)= number of favourable outcome / number of total outcomes task
P(E)=n(E)/n(s),,
Probability class ,event
P(a),,(P(a)+P(b),,multiple eventbdijoins,event course
Mark --------
_psychometric trade ,test aptitude ,scale ,,iQ,, intelligence
quotient,factor recruitment,

- intelligence quotient test , progress ,IQ score ,score divided persons mental age score obtained administration an intellence ,test ,person chronological..

Mental age /cronologie age ×1000, measure ,,

Didactic instrumental measure control ,error mean , material didactic:

10.13. Explanation: ,criteria didactic framework qualifications., academic transcript certificate graduation/award degree diploma certificate , assessment no meeting -Saqa qualifications: I'd 93852 |
-Qualifications title: Education technologie
-minimum credit :120 |NQF: lev08
-Purpose :practicing teach lecture technologie decisions , bachelor ,emerging technologies
Advance diplome NQF level 7
-exisr level : and
- digital design ICT and social ,police lracty , research methods ,ICT literacy,
Bachelor of education technology ,
Master of information technology science technologie.

Saqa : 78964 : further and training certificate technical support level
Purpose : fundamental computer ,science technologie
- hardware infrastructure personal
- computer ,
- data communication network.
*Specialist computer ,cabling , knowledge electronic ,personal computer repairs ,offucd ,
- described install scanning system :
- described install photocopies machine ,.descry install computer printer ,
High volt photocopke .
-data communication .
- explain PC ,architecture , problem solving resolve computer , user problem computer , assemble computer personal ..--_____
Saqa qualifition I'd : I'd 15867:
Qualifications : advance diploma in technical and vocational training ..
- credit :120/ NQF level 7 ,
Module NQF / I t ,8
- foundT of in technical and vocational teaching ,32,credit professional , development ,8 credit ,work integrated learn 24 credit
- elective NQF 7,49 credit ,
Civil engineering building construction
Electrical infrastructure construction ,49credit ,.
Engineering related design ,5 ,finana jaj ,TVET advance level adult community ,TVET police outct ,political TVET learn level 8.

-10.14 explain : how to install computer component ,personal ,- Assembling a computer by step.-1step preparing the motherboard ,2mounting the processor,3,installing
- Install ,PC window, click Kell storm, programmation.-list of printer phocooie ,Business ,D1022-CP@,3.double click your department, Photocopy to add it ..--1 f

-explanation: TVET college and instituts record academic, outcome,saqa instituts foreign no meeting instution non accredited policy criteria award

diplome in electrical and NQF 6, professional /Giger educare ,
-Saqa ID: 121217,360 credit ,ECSA circulum in tank graduated with theory in electrical system , electronics ,power generation,control system ,digital electronics ,project real ,

Alison Dublin , cpd continue professional development
Candidate professional engineering
Technician ,learn leading ,autocads ,esca leading , autocad ,autocad ,electric ,office 364 Education,A1 license , recruitment ,n3,n4,n5,n6 marks ,,
-saqa ,ID : 111145 ,advanced electrical , electronics Unisa level 7, bachelor's university.

_____
Explain : Construction management control of construction introduction ,Rsa construct ,construction industries,
Module 2 compliance ,contract and regulations,learn low and regulations relevant,module : implementation health and safety and environmental discovery the importance health and safety ,and environmental management in the construct ,module pricing the project : construction ,planning project ,discove project planning and supply ,
- module protect the cash flow ,module quality ..

TVET learn managent system:
 information system , administration name system I'd system learn ,teach explain ,dhet ,saqa
Direct order activities ,
Social education , legislation education
Orientation supervisor management:

...

The purpose of this foreign institution’s enquiry service is to give some direction regarding accredited and non-accredited foreign institutions.

Please go to the following link: https://www.dhet.gov.za or access SAQA's searchable website database, the link is https://regqs.saqa.org.za/search.php?cat=qual for information pertaining to the accreditation status of South African institutions and their qualifications.

Kind regards
Authentication Services
SAQA

The National Qualifications Framework (NQF) Act 67 of 2008 mandates SAQA to provide a foreign qualifications evaluation and advisory service, which it does in accordance with the Policy and

Criteria for Evaluating Foreign Qualifications within the South African NQF, as amended (March 2017). Section 29(a) of the Policy and Criteria stipulates the requirements that a foreign awarding institution must meet for its qualifications to be recognised.

From: SAQA <email@saqa.piidigital.co.za>
Sent: Wednesday, April 17, 2024 12:11 PM
To: foreigninstitutions <foreigninstitutions@saqa.co.za>
Subject: New message from "SAQA"

Full Name:: tshingombe
Email Address:: tshingombefiston@gmail.com
Country Enquiring From:: Congo {Democratic Rep}
Purpose of Enquiry:: Check status for further study purposes
Institution Details:: st peace college afric institut police
Attach Document(s):
https://www.saqa.org.za/wp-content/uploads/elementor/forms/661fa039d9235.docx
Website Address:: www.tshingombe.com
Institution Physical Address:: markadet street president
Comments:: Gmail tshingombe fiston
RE: appeal application qualification occupation n diplomat award dr congo leaver 2016 submission and transcript certificate record supplementary .;.rsa completed n diplomat studie engineering n4.,n3;n5 n6.. ; quality insurence body irregularities in pr...

Mrs Sonnika Lundt

University Capacity Development

Department of Higher Education and Training

123 Francis Baard Street, Pretoria Central

Room 506_012 312 5440

lundt.s@dhet.gov.za

Incident INC000025277051 reported by you has been resolved. Request assistance from Dept of Higher Education and Training

Inbox

itsmprd@sita.co.za
<itsmprd@sita.co.za>

Tue, Mar 19,
12:52 PM

to
me

Dear Tshingombe Fiston,

We are pleased to inform you that your reported Incident has been resolved.

Reference No.: INC000025277051
Summary: Request assistance from Dept of Higher Education and Training

Your reported Incident has been resolved with the following resolution:
The N3 statement of results for 2100002023812 for the 2023/11 exam was released and sent to SHALOM TECHNICAL COLLEGE on 01/02/2024 waybill number 080057034873 (SkyNet couriers). Candidate does not qualify for a certificate as he did not pass all subjects. For a diploma to be awarded (as per the complaint), a candidate must achieve N4, N5 and N6 certificates and also have the relevant experiential work, then submit the application at the college. This candidate does not qualify for that. Complainant was responded to via an email.

Please do not hesitate to contact the Service Desk should there be any further questions or inquiries regarding your Incident. Please quote your assigned Reference Number.

Yours sincerely,

Service Desk
Case 2403110060003192 TrackingID#2403110060003192

Inbox

Microsoft Support Thu, Mar 28, 1:52 PM (8 days ago)

eady to light up your career?

- Ready to light up your career? Whether you are an artisan or engineer; graduate or experienced professional or tradesperson, we look to attract people who will add value to our business.
- We may not always have vacancies open, but when we do, you'll find the information below.
- If you meet all the requirements outlined in the job profile and can provide all the relevant documentation to support your application, then we invite you to apply.

External candidates should:

- Step 1: Download the application form (Download the Application Form).
- Application Form

City Power Application Form for Employment.pdf

- Step 2: Complete the application form
- Step 3: Attach all the required documentation
- Step 4: Submit application to the email address provided and wait for feedback.

- You will receive a call or SMS from City Power if your application has been successful. This may take up to 3 – 4 weeks.

Vacancies

Looking for a career opportunity in City Power! Well, the opportunity within is just a click away. Candidates can now search and apply for jobs online – at any time, from anywhere. Whether you are a school leaver, professional or tradesperson, we could have a position to suit you. City Power aims to be an employer of choice by attracting highly-skilled people who will add value to the organisation.

Permanent Vacancies
VIEW

Fixed Term Vacancies
VIEW

Temporary Vacancies

How big is your house (m^2)?

Do you know your tariff in R/kWh inclusive of VAT?

YES

*What is the name of your town?

tshingombe

*How many adults live in your house?

*How many children live in your house?

Do you have an electric stove?
YES

a. How many stove plates do you use per day?

b. Approximately how many minutes do you use each plate?

c. How many hours per week do you use your oven?

Do you have a geyser?

YES

At what temperature is your thermostat set?

Do you have a washing machine?
YES

a. How many loads do you wash in your washing machine per week?

b. Do you use hot or cold water cycles?

c. How many hours per week do you use your clothes dryer?

Do you have a dishwasher?
YES

a. Approximately how many loads per week do you wash in your dishwasher?

b. How many minutes does the dishwasher run per wash?

c. How many times a week do you hand wash dishes?

Do you have a swimming pool?
YES

a. What is the size of your swimming pool pump (Watts)?

b. How many hours per day do you run your pool pump?

Do you have a hot tub / spa?
YES

a. What is the size of its electrical heater (Watts)?

b. On average how many hours a week do you use it?

Is your ceiling insulated? 1

YES

VIEW
Skills Development Opportunities

An opportunity offered to inexperienced young adults and interested employees.

View Internships
VIEW

User: tshingombe - 2024/05/29 11:51:15

Here you will see what your estimated electricity cost and usage is, and energy savings tips to help you bring your costs down. If you input your usage data every month, we will record your data here. In time, with enough users inputting their data, you will see how your usage decreases and compares to others in your area. Thank you for being energy conscious!

Your electricity cost this month

R304.00

Your power usage this month

116.00kWh

Power usage by category

Total consumption

Kitchen 27.65kWh

Outside 0.03kWh

Bathroom 86.88kWh

Bedroom 1.83kWh

Power usage by appliance type

Total consumption

Savings tips

lighting

1. Replace all your CFLs (Compact Fluorescent Lamps) with energy saving LEDs (Light Emitting Diodes) - switch off lights in all unoccupied rooms.
2. Install day-night sensors on outdoor security lights.
3. Ensure that your oven door is closed until the food is done - opening and closing it wastes energy.

:

My Applications

Position	Created

Re-advert Snr Engineer Prof Electrical (Generation) Duvha Power Station

1 - 30

Position : Snr Engineer Prof Electrical **Vacancy type: External/Internal**

Task Grade : P16

Area of Speacialization : To provide a specialist engineering service to Generation power stations.

Department : Engineering (Electrical)

Lms frameworks regulatory : explanation :
Information management .compagny :explanation
Eskom mandate from share holder ..
Assis the businesses africa growth providing stability of electricity supply throug provide in efficient efficiency sustainability maner will achieve an electricity newtwork .generation.transmission and distribution whist ensuring that is ..
Purposr statement .powe growth syst ..vision sustaina3 power better futhure .
-delivery : missioj statement turn around existing business and resculable eskom oper2 financial sustainability create a sustainability eskom serice economie ...
-Explanation stragic objectivs : purpose financiak operationel sustainability facilitator a competive future energy industry modernise our power ...
Explanation eskom .organizations structure eskom holding cooporate
functions .generation .transmission distribution eskom industrial roteck.
Explanation. Leadership eskom board executive executives.committed chairperson acting chief finanxiaj .non executive .independence eskom conduct annual
.effective. ..
Explanation .investor integrated interime result ..
Gover2 guarented government rsa recognise eskom critical role in the economy and remains ensuring eskom finananciaj stability oon 28 october 2011 gov annluced would extend its guarented .eskom R174.vn to total of r 359..
Explain eskom bonds financiak years funding reayi2 necessite insurance of deb in the domestic and internationaj deb capital ..compare .
_explain sustanability developments sustainably developments overview assessment.EIA transmission.EIS generation. Archive d project eskom inyegrited sustainability developments issue into decission ..make long term .provids energy service integration economic development frameworks.
-safety health environmental qualiry policy 32-727
-safety healtg environmental quality poster 32.
Eskom RTs research direction repoet ..
Dual 132kv switch station transmission masa ..substation 400kv line to 132 kv .
- supplementary demande response programme load provide tha response noticd period of 30 minute to six hours to restor reserv replace capacitor maximum duration agreed witg the supplier .
-Explanation commerciaj and residential demand response responsabilitie..pilote eskom is piloting nationak demand responsability programe successful pilote test among other the appropriate technologies evaluate.50mw.
Explain csi .compagny information:
Leadership susidiary about electricity sustainability.developments cooporation contact generation

cool procurement process primairy energy eskom own and variouse coak nuclear .transmission syatem developments planing .
Demande response define measured changev in electricity customer or load
Explain .typical reduction activitie resucing electricity power poweredtoto production equipment .turning of air conditioning unit shutting ligths .
Esko system is responsible forreliability and securitt rsa grid by monitoring operationel.
-power stàtion security so with mutch neèd .flexibìlity and reliability and to maìntaining adequate daily opeŕationel opeŕationel margin cater circumstance stabilìty factor system conraits caußе weathe

P

On Sun, 31 Mar 2024, 19:16 tshingombe fiston, wrote:

Purpose :orienation industrial ,organisation planingsupervision management supervision ..
..management system information data portal student .
-data portal student eskom :
Claim Id .rdkqdn2udun4uze.
Claim passcode :×wb nxmkjh5izpqg
Date of drop - off : 2024 -o3-08...10:31:05
-sender .name eskom automa2..organization eskom ..
Email adress noreply portsl @ eskom .co.za .
-files name eskom k87w.cvs descfiption 5y data reauested size .12.7mb
- zend to trying drop off some file servic name : tshingombe engineering st peace college.
Email:tshingombe fiston @ gmail.com
Drop off same files for .
Process ..https zsnd to eskom .co.za droo off.auth=9a2334e836a4f1b1afc6dec30d1fadc6 dec 30 d1fi50 copyright2023 ..21 days zev retrieview

On Sun, 31 Mar 2024, 12:17 tshingombe fiston, wrote:

Enquiry: re qualification..
. ID: saqa explanatiry return refund ID 201911130002; id 202211165055; 202207085055; ID 22071250145; ID202303115021;
2022-11-16.45
26 mars application .
26 mars .
Enquiry 26 15 :06 SAQA (NQF)act 67 2008 mandates saaa to provide qualification evaluation and advisory services which it does in accordance with saqa nqf as amende march 2017 section a of thr policy criteria stupilate that foreigb award institution meet for qualification to be recognise.
-leaver school dr congo ..statement leave statement n1,n2n3 . Leaver statement ..
-final award graduation certificate .;completed transcript .mark sheet academic record ;translate
-application does not meet requirements not .
-Cvs currilum saqa
Person mr tshingombe tshitadi id number :TIRCOG000910610. Race afric ..vacance 2023 /434 ict manage .....

□□□□□□□□□□□□□□□□□□□□□□□□□■■■■■■■■■■■■■■■■□□□□□□□
18 april call institution is not registered under Dhet check college QCTO ..10167..
Officer lindiwe grace mahlangy Reoul i have copied ou QA unit ..mahlangu .lqcto..org.za ..
(LMI) Dhet research ..survey B..sept 2023 methode evidence base methode ..
-director system monitor labour market intelligences dhet ..khuvule m @dhet.gov.za ..response on career student meeting goal , skill planing : .

On Sat, 30 Mar 2024, 21:26 tshingombe fiston, wrote:

Statement of work instruction n diploma engineering studie .saqa qualification n diploma enginering

stuie saqa learning programe Id : 67043 national n diploma nqf level 6 360

Scope work experience .: date sign
.statement of work experience logbook .learner detail :sur.
Employer detas compagny name adress :st peace college .engineering 84 president topics and career ./ career external candidat compagny city power
; compagny eskom , compagny . Compagny .sarb .dtic portal

-learner name : ..
_Supervisor name : lecture senior .trainer engineering .
Work telephone : 011330171
-employer .perform manuel soldering desoldering for installation and fabrication installation .
Date :02/03/2023 / sign tsh ..
Undertaking material .reading and interperting routin information on written specification
Topics industrial electronic explanation
.experimental lab electronics workshop assessment critical welding drawing engineering welding metal outcome .

Code w2 .iterpret technical draw looking evidence .confirm skill
Checking drawing job requirements relate explanation .electrical trade theory electrotechnology find falut explanation make labelled circuit balb switch wiring way .and serie laralle curcuit ...labsl
W- confirming drawing inccordancr operation ..where appropriat obataining current version .
W. Reading inyerpreting informatiob thr drawing procedure ..checking clarifying task related informatiob ..where appropriate apply lubrifiysbr accordance where appropriate applying packing inspecting the finak assemvle where appropriate ..
Topics engineering science ..and physic engineering practical strent matter solod liquid gaz ..chemical engineering topics ..linearisation fundamel mass ..mxacceleration kg ..
- diagnosr and repairvequipment obtain following circuit specification schematics record supplie ..locating obtaining error code interpretation equipment status indicated assembly compnent connection by buily conecting ..removing replace repair ..recording result of test undertaken on electronicd isolating adjust calibratiin returning service isolation assembly from the power suply recommissioning electronics .maint control instrum...
-Topics . Electronics industrisl trade theory electric mait care electrotechnology part ac dc machine topics construction machine component relate constitution step .. engineering drawing vue top side cut sectionel ..
□□□

to reply,
me

Go to mySchneider

Translate to:

Please select

Help

- Community Home
  - Forums
  - Knowledge Center
  - Events & Webinars
  - Ideas
  - Blogs

Follow along for an enriching discussion with our CEO, Peter Herweck, and industry leaders for a captivating Global Keynote at #InnovationSummit Paris 2024. **Watch recording** and join the #ImpactMaker movement!

- Schneider Electric Community
  - About Fiston

Tshingombe fiston

Cadet

Online

Company :

Tshingombe engineering

1

Post

0

Likes Received

0

Likes Given

0

Solutions

Community Badges

Schneider Electric Case # 107583452: Re: Schneider Electric Case # 107331069: Training Inquiry - [thread::WxL1v0u7caieatIXKAsfgj4::] -

Inbox

Schneider Electric <za-quotes@schneider-electric.com>

Fri, Feb 23, 10:19 AM

to
me

Dear Customer - IMPORTANT: PLEASE use your Schneider Electric Customer Number on ALL orders

Case Reference #: 107583452
Question: On Tue, Feb 13, 2024 at 10:37 AM Mail2Case -ZA QUOTES <za-quotes@schneider-electric.com> wrote:

Dear Tshingombe
fiston,

Thank you for contacting
Schneider Electric Customer Care Center.
Kindly find below our reply to your request.

Case Reference # : 107331069

Date Created: 2024/02/13

Subject: Training Inquiry

Answer:

Kindly note that for training inquiries please contact Schneider Academy ZA

Contact person - Dilaine Subban
email:
dilaine.subban@se.com / za-training@se.com
Tel: 0110461900/02

To view all contents of courses, pricing, scheduled dates (virtual Instructor-led or classroom training) and to make a booking, please click on the training page
link: https://www.se.com/za/en/work/services/training/

In case of any further assistance, please do not hesitate to contact us.

Tel:

· 086 130 0222 (South Africa only)
· +27 11 230 5880 (All countries)

E-Mails:
· Commercial support (For Orders-Partners only):
za-ccc@schneider-electric.com
· Technical support (For Technical assistance, price and availability):
za-quotes@schneider-electric.com
· Returns:
za-returns@schneider-electric.com

Bill of Material - My configuration - 607079d9-fa26-423a-9d8c-d810df173a87 - Schneider Electric

Inbox

Fri, Jan 12, 12:18 PM

No reply
<iac.noreply@verified.se.com>

to
me

Dear Tshingombe fiston,

Please find your configuration My configuration created with the Modicon PLC Configurator application.

Your configuration ID: **607079d9-fa26-423a-9d8c-d810df173a87**

Bill of Material

Bom level	Position	Reference	Description	Quantity
My configuration	1	LMC100CAA10000	Motion controller LMC100 0 axis - Acc kit - Basic	1
My configuration	2	ABL8WPS24200	Regulated switch power supply, modicon power supply, 3 phases, 380 to 500V AC, 24V, 20A	1

...

Bill of Material - My configuration - 607079d9-fa26-423a-9d8c-d810df173a87 - Schneider Electric

Inbox

Fri, Jan 12, 12:18 PM

No reply
<iac.noreply@verified.se.com>

to
me

Dear Tshingombe fiston,

Please find your configuration My configuration created with the Modicon PLC Configurator application.

Your configuration ID: **607079d9-fa26-423a-9d8c-d810df173a87**

Bill of Material

Bom level	Position	Reference	Description	Quantity
My configuration	1	LMC100CAA10000	Motion controller LMC100 0 axis - Acc kit - Basic	1
My configuration	2	ABL8WPS24200	Regulated switch power supply, modicon power supply, 3 phases, 380 to 500V AC, 24V, 20A	1

...

[Message clipped] View entire message

Bill of Material - My configuration - afef9d8c-ed8a-40d8-8195-5009b9413968 - Schneider Electric

Inbox

t

Fri, Jan 12, 12:20 PM

No reply
<iac.noreply@verified.se.com>

to
me

Dear Tshingombe fiston,

Please find your configuration My configuration created with the Modicon PLC Configurator application.

Your configuration ID: **afef9d8c-ed8a-40d8-8195-5009b9413968**

Bill of Material

Bom level	Position	Reference	Description	Quantity
My configuration	1	BMXP341000	processor, Modicon M340, max 512 discrete, 128 analog IO, Modbus	1
My configuration	2	BMXCPS2000	power supply module, Modicon X80, 100 to 240V AC, 20W	1
My configuration	3	BMXXBP0400	rack, Modicon M340 automation platform, 4 slots, panel, plate or DIN rail mounting	1

...

Bill of Material - My Configuration - 2990198c-6d29-4dcd-98e9-b41d44239222 - Schneider Electric

Inbox

Fri, Jan 12, 12:39 PM

tshingombe
<iac.noreply@verified.se.com>

to
me

Dear tshingombe,

Please find your configuration created from: EcoStruxure™ Motor Control Configurator
Configuration link: **My Configuration**

Your configuration ID: **2990198c-6d29-4dcd-98e9-b41d44239222**

Motor Starter parameters selected

Technology: Variable Speed Drive
Supply Voltage: 240 V
Motor Power: 2,2 kW
Segment and Process: Machine Manufacturing
Application: Standard machines
Heavy Duty selection: no
Breaker

SCCR: 30 kA

Contactor

Coil voltage: 230 V AC - 50/60 Hz

Coil Type: Standard

Drive

Bill of Material

Devices	Options	Description
Breaker		
GV2ME32		Motor circuit breaker, TeSys Deca, 3P, 24 to 32A, thermal magnetic, screw clamp terminals, button control
Contactor		
LC1D25P7		Contactor, TeSys Deca, 3P(3NO), AC-3/AC-3e, <=440V, 25A, 230V AC 50/60Hz coil, screw clamp terminals
Drive		
ATV12HU22M2		variable speed drive, Altivar 12, 2.2kW, 3hp, 200 to 240V, 1 phase, with heat sink

Need help ? Contact the Customer Support .

RE: My.Eaton.com Unknown Supplier Organization

Skip to main content

Show Navigation Menu

Main content below

Completed Training: Tshingombe fiston

Title	Type	Completion Date	Score	Status
Schneider Electric's Vision Edge 2022: Powering Digital Transformation	Video	3/5/2024		Completed
Secure Power_Virtual Certification_on demand 2021_sesion 4	Video	1/24/2024		Completed
Cooling Virtual Certificaion_on demand 2021_sesion 2	Video	1/24/2024		Completed
Technical Expert Assessment Video	External Content	1/23/2024		Completed
DirQ_GL36R00 Technical Expert Assessment	External Content	1/23/2024		Completed
Technical Expert Assessment Workflow	External Content	1/23/2024		Completed
Technical Expert Assessment GuideBook	External Content	1/23/2024		Completed
Schneider Electric Information Technology guide	Material	1/23/2024		Completed
Heating, Ventilation and Air Conditioning (HVAC): Discover the Machines	Online Class	1/23/2024	0	Completed
Room Ventilation And Airborne Disease Transmission In A Healthcare Setting	Online Class	1/22/2024		Completed
Ecostruxure Power: Energy Modeling and Verification (SSOW)	Video	1/22/2024		Completed
Vérification de la facture /EcoStruxure Power: Utility Bill Verification (French)	Online Class	1/22/2024		Completed
Discover Telemecanique Sensors	Curriculum	1/22/2024		Completed
EcoStruxure Power Operation: Ch7 - Add Mechanical Graphincs and Controls	Video	1/21/2024		Completed

ASCO: Fundamentals in Technical Document Review	Online Class	1/18/2024		Completed
EBO 2023: Introduction to Docker	Online Class	1/18/2024		Completed
EcoStruxure Security Expert: Biometric Reader Integration 4.3	Video	1/15/2024		Completed
Discover Harmony XB5S Biometric Switches	Video	1/15/2024		Completed
EcoStruxure Building: LonWorks Introduction Part 3	Online Class	1/15/2024		Completed
Innovation Talk: Why Alarm Management is the tip of the iceberg- and the best indicator of a poorly performing control system	Video	1/15/2024		Completed
PowerTalks: Equipment Performance	Video	1/15/2024		Completed
EcoStruxure Building: Script Programming (Self-Study)	Material	1/15/2024		Completed
Drives: Fundamentals of Kinematics: Calculation Centrifuge	Video	1/15/2024		Completed
Gestion de la Capacité /EcoStruxure Power: Capacity Management (French)	Online Class	1/15/2024		Completed
ASCO: Low Voltage Construction Fundamentals	Online Class	1/15/2024		Completed
Migrate from Legacy Graphics	Video	1/15/2024		Completed
Physical Infrastructure Management Basics	Online Class	1/14/2024		Completed
Fundamentals of Physical Security	Online Class	1/14/2024		Completed
Schneider Electric Approved EV Installers : IT Architecture	Material	1/13/2024		Completed
Advanced Lighting Control with KNX and DALI	Online Class	1/13/2024	0	Completed
ASCO: Application of Circuit Breakers in Power Control Systems	Online Class	1/13/2024		Completed
Security Expert Transition Guide	Material	1/13/2024		Completed
Discover Wiring Devices: Technical Structure and Applications	Online Class	1/12/2024	0	Completed
Internet: 50+ Years of Innovations and Inventions that Made It	Curriculum	1/12/2024		Completed
Computer History in a Photo Album	Curricul	1/12/202		Complet

	um	4		ed
Digital Economy: Movers and Shakers	Curriculum	1/12/2024		Completed
Your Computer’s Secrets	Curriculum	1/12/2024		Completed
Trending Digital Technologies	Curriculum	1/12/2024		Completed

Back Print

rans cript Repo rt

Nam e: Tshingombe fiston
Busi ness Unit PRM
Date Crite ria Type : Training End Date - Session

Application Unsuccessful SF7479 TM Portfolio Maintenance

Inbox

t

Candice C Gounden <system@successfactors.eu> Thu, Jun 13, 5:18 PM (4 days ago)

to me

t

~~~~~ **Important:** Please add your response above this line ~~~~~
For successful processing of your response, do not delete the *CorrespondenceCode* and other content in this email.

Dear Tshingombe Tshitadi ,

Thank you for applying for Team Member: Portfolio Maintenance X3. After careful consideration we regret to inform you that your application was not successful.

We wish you everything of the best in your future applications.
~~~~~

Yours Sincerely,

SARS Talent Acquisition Team

Note: Do not attach files when replying to this email.
Please do not include any sensitive information in this email.
CorrespondenceCode #a1bb5f53989165c3ea37aa428ea0931c$

obs Applied table, to focus press T in JAWS virtual PC cursor mode on. Use Control + Alt + arrow keys to navigate the table.

Job Title	Actions	Req ID	Date Applied	Status	Status Date	Next Step	Region	Location
Analyst: Data & Reporting	Select	7504	10/12/2023	New Application	10/12/2023		Region(1)	Location (1)
Auditor	Select	7198	11/11/2023	We are currently reviewing all applications	11/11/2023	We will advise on the outcome of the process as soon as it is finalised.	Region(1)	Location (1)
Auditor: Compliance Audit	Select	7490	17/11/2023	Reject	21/11/2023	Please apply for another opportunity	Region(4)	Location (8)
Auditor: Compliance Audit	Select	7495	22/11/2023	We are currently reviewing all applications	22/11/2023	We will advise on the outcome of the process as soon as it is finalised.	Region(1)	Location (1)
Auditor: Level 3 - (Indirect Tax)	Select	7285	10/11/2023	We are currently reviewing all applications	10/11/2023	We will advise on the outcome of the process as soon as it is finalised.	Region(1)	Location (1)

Business Area Lead: High Value Debt	Select	6563	10/11/2023	We are currently reviewing all applications	10/11/2023	We will advise on the outcome of the process as soon as it is finalised.	Region(1)	Location (1)
Consultant: HR Business Partnering	Select	7476	15/11/2023	We are currently reviewing all applications	15/11/2023	We will advise on the outcome of the process as soon as it is finalised.	Region(1)	Location (1)
Consultant: Legal Delivery	Select	7294	10/11/2023	We are currently reviewing all applications	10/11/2023	We will advise on the outcome of the process as soon as it is finalised.	Region(1)	Location (1)
Debt Collector (Estates)	Select	7493	22/11/2023	We are currently reviewing all applications	22/11/2023	We will advise on the outcome of the process as soon as it is finalised.	Region(1)	Location (1)
Debt Collector (Estates) 3x	Select	7499	26/11/2023	No longer under consideration	07/12/2023	Please apply for another opportunity	Region(1)	Location (1)

tshingombe fiston
<tshingombefiston@gmail.com>

Wed, Jan 10, 12:45 PM

to
SARB

Active Job Applications

- (102) Robotic Process Automation Engineer - BSTD

  Pretoria, South Africa

- South African Reserve Bank 102 Applied on 12/12/2023

Inactive Job Applications

- (47) Manager - Banking Supervision

  Pretoria, South Africa

  Status Application Unsuccessful

  South African Reserve Bank 47 Applied on 12/12/2023

- (99) Artisan-Electronics CT

  Cape Town, South Africa

  Status Application Unsuccessful

  South African Reserve Bank 99 Applied on 12/12/2023

Skip navigation elements to page contents

Workflow

0

Logged In As TSHINGOMBEFISTON@GMAIL.COM

Worklist >

Vacation Rules

Deliver to me	AP Invoice Approval	<All>			Inactive
Deliver to me	AP Invoice Approval	<All>			Inactive

Deliver to me	iRecruitment Notification Workflow <All>	t	t	Inactive
Deliver to me	iRecruitment Notification Workflow <All>	t	t	Inactive

nvoice Summary to fiston tshingombe

Request payment from **fiston tshingombe**. Expenses will be processed once approved by a Collective admin. The amount, description, and your profile name are public, but attachments, payment details, and other personal info is kept private.

engineering databse

Invoice

Submitted by Fistin

Mar 18, 2024

Invoice items

engineering data system
Date: December 3, 2024
$10,000,000.00 USD

Total amount $10,000,000.00 USD

Attachments

visual tshingombe.pdf

Additional Information

Collective

fiston tshingombe@fiston-tshingombe

Balance:
$1,000,000.00 USD
Pay to

Fistin@fistin

20 percy street 103 jhb jhb 1030 Gauteng
ZA
payout method

Other
Details
engineering data base
Additional invoice information
23

Is this a recurring expense?

Choose this option to automatically submit a copy of this invoice on a periodic basis.
Add notes
(optional)
Collective balance

$1,000,000.00 USD
Fiscal Host
fiston tshingombe

[GitHub] A third-party OAuth application has been added to your account

Inbox

GitHub Mar 16, 2024, 9:12 PM (2 days ago)

to me

Hey t5h2i0tadi!

A third-party OAuth application (Open Collective) with public_repo and read:org scopes was recently authorized to access your account.
Visit https://github.com/settings/connections/applications/af81e50527255ecf7cd6 for more information.

To see this and other security events for your account, visit https://github.com/settings/security-log

If you run into problems, please contact support by visiting https://github.com/contact

Thanks,
The GitHub Team

Conversation opened. 2 messages. All messages read.

Skip to content
Using Gmail with screen readers

56 of 4,398
[Grav Community Forum] Confirm your new account

Inbox

Grav Community Forum Sat, Mar 16, 8:46 PM (2 days ago)

Welcome to Grav Community Forum! Click the following link to confirm and activate your new account: https://discourse.getgrav.org/u/activate-account/f851153cb98

Grav Community Forum <notifications@getgrav.discoursemail.com> Sat, Mar 16, 8:47 PM (2 days ago)

to me

Welcome to Grav Community Forum!

Click the following link to confirm and activate your new account:
https://discourse.getgrav.org/u/activate-account/6d37a9b75c3f195f9d20abc3f9f89536

Attachment tshingombe github visual studio opened.docx added.
None selected

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Message sent
91 of 4,398
dev.azure.com/tshingombefiston0053 is now ready!

Inbox

Azure DevOps Mar 15, 2024, 7:48 PM (3 days ago)

to me

Azure **DevOps**

Welcome to Azure DevOps

dev.azure.com/tshingombefiston0053 is all yours.

to
Azure

Thanks, I'll check it out!

tshingombe fiston 11:49 AM (0 minutes ago)

to
Azure

One attachment • Scanned by
Gmail

Skip to main contentAzure DevOps
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/
ENGINEERING TSHINGOMBE

/
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/
Summary

Account manager for Tshingombe Tshitadi
ENGINEERING TSHINGOMBE
OverviewSummaryDashboardsWiki
Boards
Repos
Pipelines
Test Plans
Artifacts
Project settings
Loading...
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About this project
Help others to get on board!
Describe your project and make it easier for other people to understand it.
Project stats
Pipelines
0%
Builds succeeded
Members
1

Attachment tshingombe github visual studio opened.docx added.
Conversation opened. 1 read message.

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86 of 4,399

Tshingombe Tshitadi reported a new issue in the Visual Studio developer communit

Visual Studio <visualstudio-noreply@microsoft.com> Fri, Mar 15, 9:05 PM (3 days ago)

to me

Engineering electrical assessment career but sustainability